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(NAVY) AN 16-30ARR15-3
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HANDBOOK

MAINTENANCE INSTRUCTIONS

RADIO SETS
AN/ARR-15 AND AN/ARR-15A

PUBLISHED UNDER AUTHORITY OF THE SECRETARY OF THE AIR FORCE
AND THE CHIEF OF THE BUREAU OF AERONAUTICS

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UNSATISFACTORY REPORT

FOR U. S. AIR FORCE PERSONNEL

In the event of malfunctioning, unsatisfactory design, or unsatisfactory installation of any of the component units of this equipment, or if the material contained in this book is considered inadequate or erroneous, an Unsatisfactory Report, AAF Form No. 54 or a report in similar form shall be submitted in accordance with the provisions of Army Air Force Regulation No. 15-54, listing:

1. Station and organization.
2. Nameplate data (type number or complete nomenclature if nameplate is not attached to the equipment).
3. Date and nature of failure.
4. Radio model and serial number.
5. Remedy used or proposed to prevent recurrence.
6. Handbook errors or inadequacies, if applicable.

FOR U. S. NAVY PERSONNEL

Report of failure of any part of this equipment shall be made on form NavAer-4112, "Report of Unsatisfactory or Defective Material," or a report in similar form, and forwarded in accordance with the latest instructions of the Bureau of Aeronautics. Such reports of failure shall include:

1. Reporting activity.
2. Nameplate data.
3. Date placed in service.
4. Part which failed.
5. Nature and cause of failure.
6. Remedy used or proposed to prevent recurrence.

CONTRACTUAL GUARANTEE

For AN/ARR-15A

The Contractor guarantees that at the time of delivery thereof the articles provided for under this contract will be free from any defects in the material or workmanship and will conform to the requirements of this contract. Notice of any such defect or nonconformance shall be given by the Government to the Contractor within one (1) year of the delivery of the defective or nonconforming article. If required by the Government within reasonable time after such notice the Contractor shall with all possible speed correct or replace the defective or nonconforming article or part thereof. When such correction or replacement requires transportation of the article or part thereof, shipping costs, not exceeding usual charges, from the delivery point to the Contractors plant and return, shall be borne by the Contractor; the Government shall bear all other shipping costs. This guaranty shall then continue as to corrected or replaced articles, or, if only parts of such articles are corrected or replaced, to such corrected or replacing parts, until one (1) year after the date of redelivery. If the Government does not require correction or replacement of a defective or nonconforming article, the Contractor, if required by the contracting officer within a reasonable time after the notice of a defect or nonconformation, shall repay such portion of the contract price of the article as is equitable in the circumstances.

WARNING

OPERATION OF THIS EQUIPMENT INVOLVES THE USE OF HIGH VOLTAGES WHICH ARE DANGEROUS TO LIFE. OPERATING PERSONNEL MUST AT ALL TIMES OBSERVE ALL SAFETY REGULATIONS. DO NOT CHANGE TUBES OR MAKE ADJUSTMENTS INSIDE EQUIPMENT WITH HIGH VOLTAGE SUPPLY ON. ALWAYS SHUT DOWN THE DYNAMOTOR OR OTHER ASSOCIATED POWER EQUIPMENT AND OPEN MAIN SWITCH IN POWER SUPPLY CIRCUIT. UNDER CERTAIN CONDITIONS DANGEROUS POTENTIALS MAY EXIST IN CIRCUITS WITH POWER CONTROLS IN THE OFF POSITION DUE TO CHARGES RETAINED BY CAPACITOR, ETC. TO AVOID CASUALTIES ALWAYS DISCHARGE AND GROUND CIRCUITS PRIOR TO TOUCHING THEM.

CONTRACTUAL GUARANTEE

The Contractor guarantees that at the time of delivery thereof the articles provided for under this contract will be free from any defects in material or workmanship and will conform to the requirements of this contract. Except as to vacuum tubes, batteries, rubber and material normally consumed in operation, the equipment, including all spare parts, is guaranteed for a period of one (1) year from the date of its delivery to and acceptance by the Government, with the understanding that all items found to be defective as to material, workmanship or manufacture will be repaired or replaced, f.o.b any point within the continental limits of the United States designated by the Government, without delay and at no expense to the Government; provided, that such guarantee shall not obligate the Contractor to repair or replace any such defective items unless the defect appears within the aforementioned period and the Contractor is notified thereof in writing within a reasonable time and unless the defect is not the result of normal expected shelf life deterioration. This guarantee shall then continue as to corrected or replacing articles or, if only parts of such articles are corrected or replaced, to such corrected or replacing parts, until one year after date of redelivery.

To the extent the equipment, including all parts and spare parts, as defined above, is of the Contractor's design or is of a design selected by the Contractor, it is also guaranteed, subject to the foregoing conditions, against defects in design, with the understanding that if ten per cent (10%) or more of the total quantity comprising such item furnished under the contract (but not less than two thereof) is found to be defective as to design, the entire item will be conclusively presumed to be of defective design and shall be subject to one hundred per cent (100%) correction or replacement by a suitably redesigned item.

All defective items will be subject to ultimate return to the Contractor except that the exigencies of the naval service may necessitate expeditious repair of certain items in order to prevent extended interruption of communications and in such cases the return of the defective items for examination by the Contractor prior to repair or replacement shall not be mandatory. The report of a responsible authority, including details of the conditions surrounding the failure, will be acceptable as a basis for effecting expeditious adjustment under the provisions of this contractual guarantee.

If the Government does not require correction or replacement of a defective or nonconforming article, the Contractor, if required by the contracting officer within a reasonable time after the notice of defect or nonconformance, shall repay such portion of the contract price as is equitable in the circumstances. Equitable in the circumstances is to be determined by mutual agreement between the Contractor and the contracting officer. Failure to agree to such adjustment shall be a dispute concerning a question of fact within the meaning of the section of this contract entitled "Disputes."

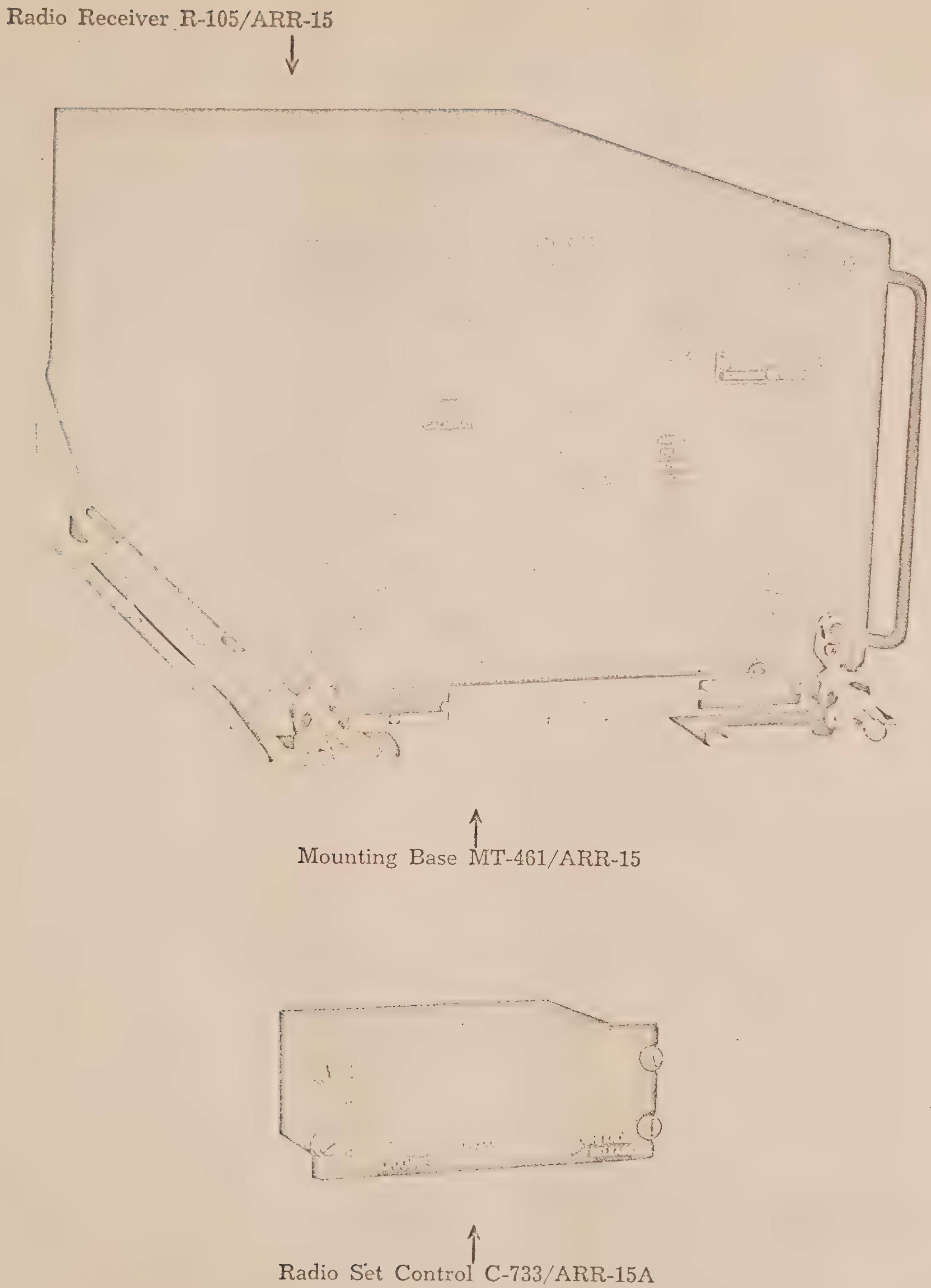


Figure 1-1. Radio Set AN/ARR-15 and Radio Set Control C-733/ARR-15A

SECTION I

GENERAL DESCRIPTION

1. GENERAL.

This handbook has been compiled as a guide to the proper installation, adjustment, operation and maintenance of the Radio Set AN/ARR-15, Radio Set AN/ARR-15A, Radio Set Control C-733/ARR-15A, and Radio Set Control C-733A/ARR-15A. Refer to figures 1-1 and 1-1A for identification of this equipment.

Since Radio Sets AN/ARR-15 and AN/ARR-15A have the same function and are electrically and mechanically interchangeable, the instructions are based upon the AN/ARR-15 equipment, but apply equally to the AN/ARR-15A equipment. Where specific differences occur between the two, reference will be made to the specific equipment under discussion.

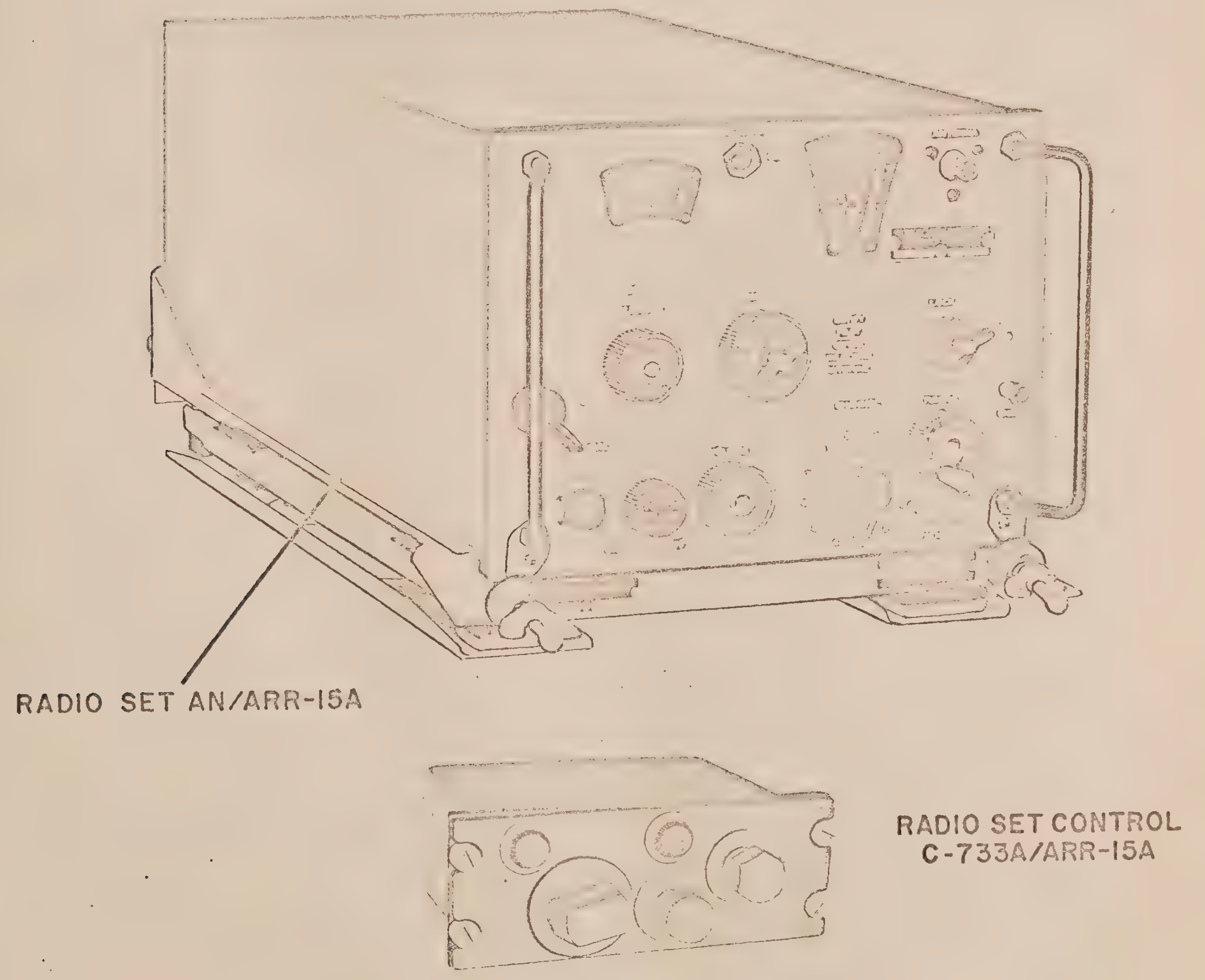


Figure 1-1A. Radio Set AN/ARR-15A and Radio Set Control C-733A/ARR-15A

In the text material that follows, references to the remote control box apply equally to Radio Set Control C-733/ARR-15A, Radio Set Control C-733A/ARR-15A, or any electrically similar control designed for use with this equipment. References applicable only to Radio Set Control C-733/ARR-15A, or Radio Set Control C-733A/ARR-15A are unmistakably identified.

2. EQUIPMENT SUPPLIED.

The following table lists the equipment supplied by the manufacturer for the AN/ARR-15 and the AN/ARR-15A, together with the type number, size and weight of each unit:

Quantity per Equipment	Name of Part	Army and Navy Type Designation	Overall Dimensions (Inches)	Weight (Pounds)	Numerical Series of Reference Symbols
1	Radio Receiver LF Oscillator HF Oscillator CFI Unit Relay Unit Dynamotor	*R-105/ARR-15 DY-34/ARR-15	7⅞ x 10⅜ x 21⁹⁄₁₆	39.5	100-199 200-299 300-399 400-499 500-599 600-699
1	Receiver Mounting Base	**MT-461/ARR-15	3¹⁵⁄₁₆ x 10⅞ x 23²⁷⁄₃₂	3.31	
1	Power Connector		1⁵⁄₁₆ x 2¹⁵⁄₃₂ x 4¹⁵⁄₁₆	.69	900-999

* In the AN/ARR-15A equipment, the receiver bears the type designation R-105A/ARR-15.

** In the AN/ARR-15A equipment (Contract N0as 5-961 and 51-1027, the mounting base bears the type designation MT-461A/ARR-15.

The following table lists the equipment supplied by the manufacturer for Radio Set Control C-733/ARR-15A and Radio Set Control C-733A/ARR-15A, together with the type number, size and weight.

Quantity per Equipment	Name of Part	Army and Navy Type Designation	Overall Dimensions (Inches)	Weight (Pounds)	Numerical Series of Reference Symbols
1	Radio Set Control	C-733/ARR-15A	2¼ x 5¹¹⁄₃₂ x 5¾	1.7	1000-1099
1	Radio Set Control	C-733A/ARR-15A	2¼ x 5¹¹⁄₃₂ x 5¾	1.7	1100-1199

3. EQUIPMENT REQUIRED BUT NOT SUPPLIED.

The following table lists the equipment required to complete an installation (furnished by the Government):

Quantity per Equipment	Name of Unit	Army and Navy Type Designation	Required Characteristics
1	Primary Power Supply	Battery and/or Generator	
1	Antenna		Fixed aircraft, ranging from 17 feet to 40 feet in length

Quantity per Equipment	Name of Unit	Army and Navy Type Designation	Required Characteristics
*	Headsets	H-1/AR or Equal	
*	Junction Box	J36A/AJA-2A or Equal	
*	Jack Box	J-22B/ARC-5	
*	Associated Radio Transmitter	ATC, AN/ART-13 or Equal	

* Depends on installation.

The following table lists the additional equipment (furnished by the Government) required to complete an installation having one remote control position, using Radio Set Control C-733/ARR-15A. Quantities necessary for an installation using multiple remote control positions are increased in proportion to the number of remote controls.

Quantity per Equipment	Name of Unit	Army and Navy Type Designation
1	Connector	AN 3106A-22-14S
1	Cable Clamp	AN 3057-12

4. PURPOSE OF EQUIPMENT.

The Radio Set AN/ARR-15 has been designed for installation in all types of Naval aircraft. The purpose of the equipment is to provide reliable, preset, multi-channel, voice, cw, and mcw, pilot or radio operator controlled reception.

5. FREQUENCY RANGE.

This equipment is capable of receiving signals on any frequency within the range 1500 to 18,500 kc. The frequency range is covered in 6 bands.

6. AUDIO OUTPUT CHARACTERISTICS.

The audio output is consistent at 500 milliwatts maximum with avc and noise limiter action. With r-f inputs of 10 to 10,000 microvolts, 30 per cent modulated, the output will contain 15% or less distortion. The audio response does not vary more than plus or minus three db relative to the response at 1000 cps for modulation frequences of 300 to 3500 cps. The maximum attenuation is attained below 300 cps and above 3500 cps. The low pass filter provided for cw reception is down 30 db or more at 1600 cps from 1200 cps reference frequency and within three db from 1200 cps to 300 cps.

7. TYPES OF RECEPTION.

Voice, cw or mcw signals may be received with this equipment. A control on the front panel of the receiver permits the selection of the type of reception. This control is designated CW-MCW-CAL and should be operated to the MCW-CAL position when it is desired to receive voice or mcw signals. When voice modulated or mcw reception is selected, the beat frequency oscillator circuit is disabled, the avc circuit is connected so as to be operative and a variable "T" pad is used to control the input to the headphones. If cw reception is selected, the avc is partially disabled, the "T" pad is disconnected from the audio output circuit, and a potentiometer connected in the cathode circuit of the r-f amplifier and first and second i-f amplifier tube circuits, is used to control the gain. Both "T" pad and potentiometer are operated by the volume control.

8. SUCCESSFUL OPERATING LIMITS.

a. TEMPERATURE.

This equipment is designed to operate at temperatures within range of —40°C to +60°C (—40°F to +140°F). At temperatures below —30°C (—22°F) a 20 minute warm-up period in still air should be allowed before making any adjustments or operating the channel selecting mechanism.

b. ALTITUDE.

This equipment will operate satisfactorily up to an altitude of 40,000 feet above sea level.

c. DISTANCE.

The distance limits of this receiving equipment will be determined by the conditions existing at the time of operating (day or night). The interference time of operating, frequency and many other con

ditions are the limiting factors. The required performance will be obtained under normal conditions encountered in aircraft radio operation.

9. POWER SOURCE REQUIREMENTS.

This equipment has been designed to operate from a 26.5 volt d-c supply. A variation of the voltage of plus or minus 10% will not materially affect the operation of the equipment. The current drain does not exceed three and one-half amperes during warm-up and reception or eight and one-half amperes during operation of the channel selecting mechanism. Dynamotor starting surge is not included in the above figures. Dynamotor starting surge is approximately 15 amperes.

Radio Set Control C-733/ARR-15A requires 80 milliamperes for panel illumination to be obtained from the instrument light circuits of the aircraft.

10. TYPE OF CONTROL.

The tuning controls located on the front panel operate all preselection and conversion oscillator circuits of the receiver. Appropriate dials, calibrated in frequency, are associated with these controls to indicate the frequency to which the receiver is tuned. The controls may be operated either manually or electrically. This equipment employs the AUTOTUNE system of channel selection. Ten frequency channels may be manually selected and the controls locked. The controls may then be repositioned electrically to any one of the ten channels by operating the channel selecting switch on the front panel of the equipment or the channel selecting switch on the remote control box whenever the ON-OFF switch at the station desiring control is in the ON position.

Note

When using one or more control boxes, the last operator that rotates his power ON-OFF switch to the ON position will have control of the equipment.

11. ANTENNA.

This equipment has been designed to operate with a fixed aircraft antenna ranging from 17 feet to 40 feet in length, which is also used for transmission. The transmitter used with this receiver should have a suitable change over relay, which will ground the receiver antenna connection during transmission.

A spring type binding post, located near the upper edge of the front panel, provides the antenna connection for the equipment.

A spring type binding post, located near the lower edge of the front panel, provides the ground connection for the equipment.

Figure 1-2. Receiver Unit R-105/ARR-15 or R-105A/ARR-15

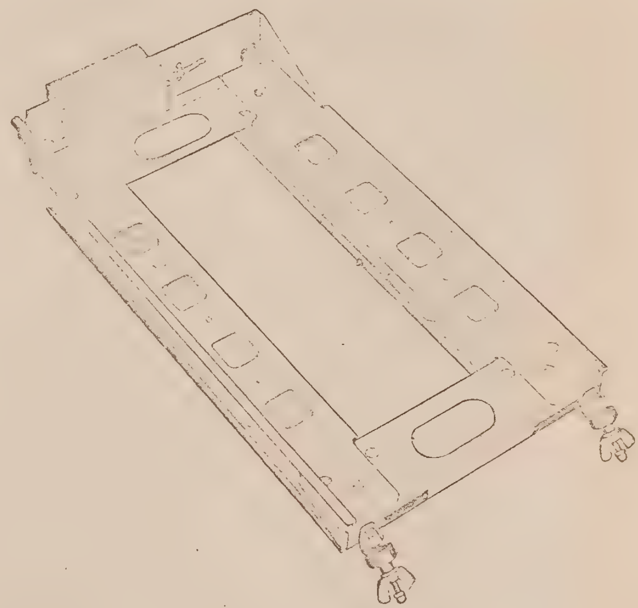


Figure 1-3. Mounting Base MT-461/ARR-15

12. MECHANICAL AND ELECTRICAL CHARACTERISTICS.

a. MECHANICAL DESCRIPTION.

(1) RADIO RECEIVERS R-105/ARR-15 and R-105A/ARR-15, DYNAMOTORS DY-34/ARR-15 and DY-34B/ARR-15, and MOUNTING BASES MT-461/ARR-15 and MT-461A/ARR-15.

The receiver and dynamotor power supply are contained in a single cabinet. The receiver cabinet has been designed to mount on a detachable shock reducing base. The base is designed to be installed as an integral part of the aircraft. The two main sections of Mounting Base MT-461/ARR-15 are held apart by live rubber cushions. On Mounting Base MT-461A/ARR-15, the two main sections are separated by coil-spring shock absorbers. It is only necessary to have access to the

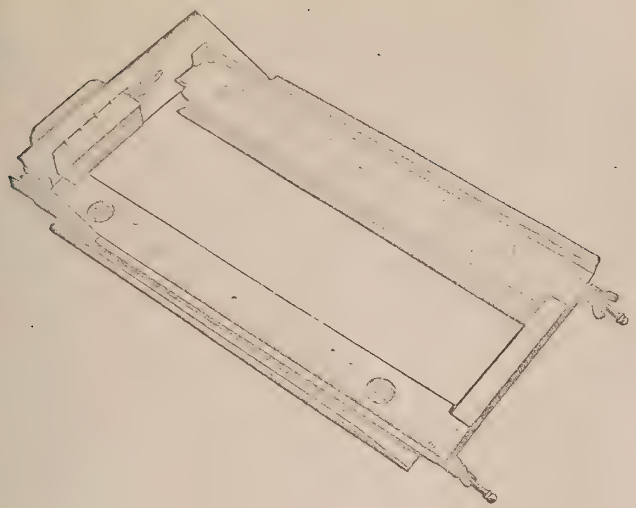


Figure 1-3A. Mounting Base MT-461A/ARR-15

Figure 1-3B. Radio Set Control C-733/ARR-15A

front of the equipment in order to fasten the unit to or remove the unit from the mounting base. The equipment may be fastened to or loosened from the mounting base by tightening or loosening two wing nuts on the front of the equipment. A multiterminal receptacle is mounted on the rear of the receiver chassis. When the equipment is fastened to the mounting base plug on the mounting base makes all of the electrical connections to the equipment except the antenna connections. In addition to the shock reducing base on the receiver, a spring and rubber cushioned base is attached to the dynamotor to prevent the vibration that is caused by operation of the dynamotor from affecting the operation of the receiver. The installation section of this handbook gives the procedure to be followed for the mounting of the base and receiver.

No external equipment except an antenna, a set of headphones and a 26.5 volt d-c power source are necessary to complete the installation for panel control. If it is desired to control the receiver from a position some distance from the installation, Radio Set Control C-733/ARR-15A or a similar control box should be used. Any number of remote control positions may be used with this equipment by connecting the switches at the remote position in parallel with the corresponding switches mounted on the receiver panel. Remote control of the receiver is entirely electrical and no mechanical linkages are necessary for the installation.

This receiver is equipped with the AUTOTUNE method of frequency selection. The AUTOTUNE system is an electrically controlled means of mechanically repositioning adjustable elements such as tap switches, variable capacitors and variable inductors to predetermined settings. Any combination of these items may be tuned to any one of several frequency channels by use of this system. In this particular equipment ten frequency channels are available. Any one of these ten frequency channels may be selected by operating a switch on the receiver panel or on the panel of the remote control box. The AUTOTUNE system will operate to select the frequency channel in a period that will not exceed seven seconds at room temperature and with a normal supply voltage (26.5 v). Lower temperature or lower source voltage or a combination of both will result in an increase in the time necessary to shift frequency channels. The accuracy of repositioning is of a very high order and is not seriously affected by wear, humidity or temperature changes. No tools are necessary for the adjustment of the AUTOTUNE mechanism. Refer to page 2-10 Section II, Paragraph 2. c. Adjustments, for the procedure to be followed when changing a frequency channel.

Every effort has been made in the design of this equipment to reduce to a minimum the time that is required for the repair or replacement of components within the receiver. All components are accessible either from the sides or bottom when the receiver is removed from the cabinet. The components in assemblies that could not be mounted on accessible portions of the receiver chassis have been built into sub units that plug into receptacles mounted on the main receiver chassis. The four units that may be removed from the main assembly are the cfi unit, relay unit, line filter unit and the dynamotor unit. With the receiver cabinet removed, the fasteners on the dynamotor are accessible from the top of the receiver. All connections except the connection to the antenna are made to a multiterminal connector plug receptacle mounted on the rear of the mounting rack.

Ground connections are made through the connector plug. The connector plug on the receiver is inserted into the plug receptacle when the receiver is secured in place on the mounting rack.

(2) RADIO SET CONTROL C-733/ARR-15A.

Radio Set Control C-733/ARR-15A is designed for panel mounting. Four captive Dzus fasteners on the panel of the control unit provide for rapid installation and removal. All connections to the control box are made through a multiterminal jack mounted on the rear of the unit. Illumination is provided by an edge-lighted plastic panel that is powered from the instrument light circuits of the aircraft. The dust cover of this control unit is readily demounted by loosening two captive Dzus fasteners, allowing access to the components for maintenance.

b. ELECTRICAL DESCRIPTION.

The receiver employs a superheterodyne circuit and will receive cw and amplitude modulated voice and mcw signals. All of the tube heaters and a dynamotor operate from the 26.5 volts d-c power source. The dynamotor furnishes high voltage for the receiving tubes.

(1) RF AND IF AMPLIFIER CIRCUITS.

The superheterodyne circuit employs one stage of r-f amplification and two stages of i-f amplification. The i-f transformers are variable and will tune to frequencies in the range 450 to 550 kc. The variable characteristic of these transformers is

Figure 1-3C. Radio Set Control C-733A/ARR-15A

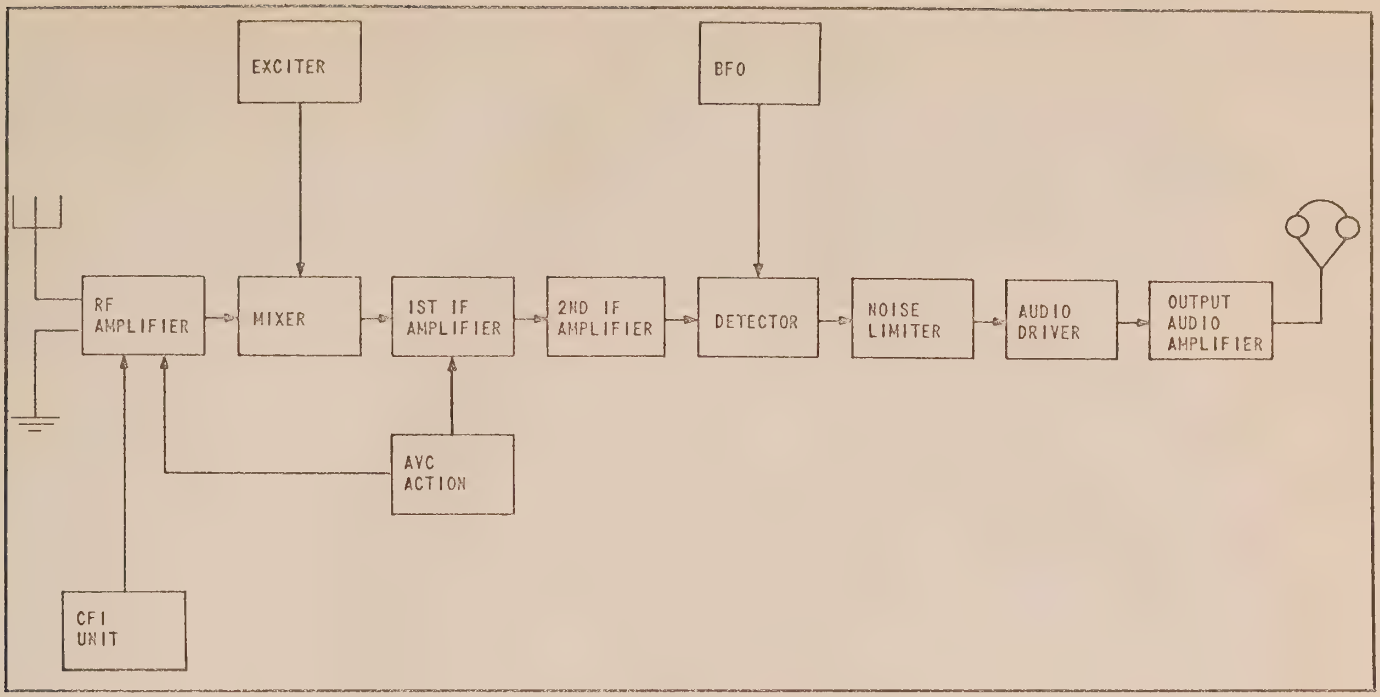


Figure 1-4. Receiver Block Diagram

used only during the calibrating of the receiver. When the receiver has been calibrated and it is desired to receive a transmitted signal, the i-f transformers are adjusted so that the intermediate frequency, as used for reception, is 500 kc. For calibration and excitation purposes three oscillators have been incorporated in this receiver. The frequency of one oscillator circuit is determined by a 100 kc quartz crystal. Harmonics of this 100 kc signal are used when calibrating the receiver. During actual reception this oscillator is disabled by removing the plate and screen voltages from the oscillator tube.

The frequency converting stage of this receiver is separately excited. One of the variable frequency oscillators is used to excite the mixer tube. This oscillator operates in the frequency range 2000 to 3000 kc and a frequency multiplier circuit is used to obtain the higher frequency excitation voltages. The remaining oscillator tube is essentially a beat frequency oscillator, but is also used during the calibration of the receiver. The output of this oscillator is in the frequency range 450 to 550 kc. When voice modulated or mcw signals are being received, the beat frequency oscillator circuit is disabled by removing the plate and screen voltage from the oscillator tube. Both of the variable frequency oscillators are precision built, mechanically and electrically, and their output is very stable under extreme conditions of humidity and temperature change.

(2) DETECTOR, AVC, NOISE LIMITER AND AUDIO AMPLIFIER CIRCUITS.

In the R-105/ARR-15 Receiver, the detector circuit employs a fixed crystal detector unit. Two tubes, a dual diode and a dual triode, are necessary for the noise limiter. The dual triode is a balancer tube while the dual diode functions as the noise limiter tube. In the R-105A/ARR-15 Receiver, the detector circuit employs one-half of a dual triode (diode connected). A dual diode and a section from each of two different dual triodes are used for the noise limiter. The two triodes are balancer tubes while the dual diode functions as the noise limiter tube. A dual triode is used to supply avc voltage, one section of the dual triode is used in a trigger circuit while the other section is used to supply the avc voltage. Two stages of audio amplification provide ample output for the operation of headphones.

(3) POWER SUPPLY CIRCUITS.

The tube filaments are connected in series parallel across the power source. The relay coils are energized by the power source. A plug-in dynamotor unit furnishes the high voltage to the tubes. The motor section of the dynamotor operates from the 26.5 volt d-c power source.

(4) REMOTE CONTROL CIRCUITS.

This equipment has facilities for connection of a remote control unit for remote power control and remote selection of receiving channels. The remote circuits should be similar to the corresponding circuits within the receiver. Any number of remote control units may be used since only one remote control can have control of the equipment at one time. Radio Set Control C-733/ARR-15A, any electrically similar control, or any combination of the two in parallel, may be used. The power

switch (ON-OFF) in the receiver is a special switch which can be turned off manually or by an electrical impulse. The electrical impulse is furnished by the remote control desiring control over the equipment.

13. PURPOSE OF TROPICALIZATION TREATMENT.

This radio set has been tropicalized as outlined in Specification JAN-T-152.

The purpose of the tropicalization treatment given the equipment is to protect the equipment when subjected to moisture and fungus conditions normally encountered. This treatment is intended to accomplish the following:

a. To render the surfaces moisture-resistant.

b. To envelop terminals and connections with a low moisture absorbing film and thereby minimize surface electrical leakage and arc-over.

c. To retard the absorption of moisture.

d. To aid in retarding corrosion.

e. To prevent the growth of fungi.

SECTION II

INSTALLATION AND ADJUSTMENT

1. INSTALLATION.

a. PRELIMINARY.

(1) UNPACKING. *(See figure 1-1)* — All the equipment for the Radio Set AN/ARR-15 which is supplied by the contractor is in one crate. This equipment consists of a receiver unit, a receiver mounting base, and a power connector to be attached to the mounting base. If the crate is marked with arrows to indicate the upright position, remove the crate cover only. Remove the packing material and lift the units out carefully. Search all the packing material for small packages. Inspect each unit for loose screws and bolts. Be certain that all controls such as switches, dials, etc., work properly. All claims for damage should be filed promptly with the transportation company. If a claim or damage is to be filed, the original packing case and packing material must be preserved. Check the equipment received against the table EQUIPMENT SUPPLIED (Section 1, paragraph 2, page 1-1).

When supplied, Radio Set Control C-733/ARR-15A is crated separately. The unpacking instructions for Radio Set AN/ARR-15 (above) apply equally well to this control box.

(2) CHECKING VACUUM TUBES AND PLUG-IN UNITS. — Loosen the receiver unit from the cabinet by disengaging the Dzus fastener that protrudes through the rear of the cabinet. Remove the receiver unit from the cabinet by pulling it forward. With the unit removed from the cabinet check all of the vacuum tubes to be certain that the proper tubes are securely inserted in the sockets. (Refer to figure 2-2 for the location of the tubes.) Make sure that all the plug-in units are firmly fastened.

(3) CHECKING CONTROLS FOR PROPER OPERATION. — Unlock the AUTOTUNE mechanism that operates the BAND switch and TUNING control by rotating each locking key two revolutions in a counterclockwise direction. Check each control by rotating it through the entire range.

CAUTION

Do not force the controls to rotate. If the controls do not operate satisfactorily with minimum pressure, check for bent parts, etc.

Check the BAND switch by turning it to each of the six positions. Rotate the TUNING control through the entire range. Rotate the BFO-CALIBRATE control. Turn the CW-MCW-CAL switch to the CW position and to the MCW-CAL position. Turn the ON-OFF switch to the ON position and release it to the OFF position by pressing the knob toward the panel. Operate the VOLUME control. Rotate the CHANNEL selector switch to each of the ten channels.

After checking the tubes, plug-in units and controls, replace the receiver in the cabinet, push it all the way in and engage the Dzus fastener.

(3a) CHECKING RADIO SET CONTROL C-733/ARR-15A or RADIO SET CONTROL C-733A/ARR-15A. — Inspect the control box visually for damage in shipment. Rotate the CHANNEL selector switch to each of the ten channels. Turn the power ON-OFF switch to the ON position. Check for proper release by rotating the control knob counterclockwise and pressing the center of the knob toward the panel. The control should snap to the OFF position. On Radio Set Control C-733A/ARR-15A, rotate the SENS control to insure freedom of movement.

(4) BENCH TEST.

(a) POWER SOURCE. — This equipment has been designed to operate from a 26.5 volt d-c power source. The filaments of the tubes are connected in a series-parallel circuit across the power input. The dynamotor, AUTOTUNE motor and relays operate directly from the 26.5 volt supply. The equipment will operate with voltages 10% above or 10% below 26.5 volts but for the best results the input voltage should be maintained as close to 26.5 volts as possible. High voltages may damage the vacuum tubes. Low voltages may result in insufficient emission from the vacuum tube cathodes. With low voltage the time required to change channels will be longer.

(b) INSTRUMENTS, TOOLS AND EQUIPMENT REQUIRED BUT NOT SUPPLIED.

1. 26.5 volt d-c supply.

2. Wire for connecting power source to plug receptacle (J-901).

3. A set of headphones (approx. 300 ohm).

4. A 500 ohm variable resistor.

5. A single-pole, single-throw switch.

6. A dummy antenna consisting of 10 ohms of non-inductive resistance and a 100 mmf capacitor in series.

7. Audio output meter. (A Weston 687, a milliwattmeter or a 15 volt meter shunted by enough resistance to match the 300 ohm output of the receiver.)

8. Signal generator. (TS-413/U, LP-4 or equivalent.)

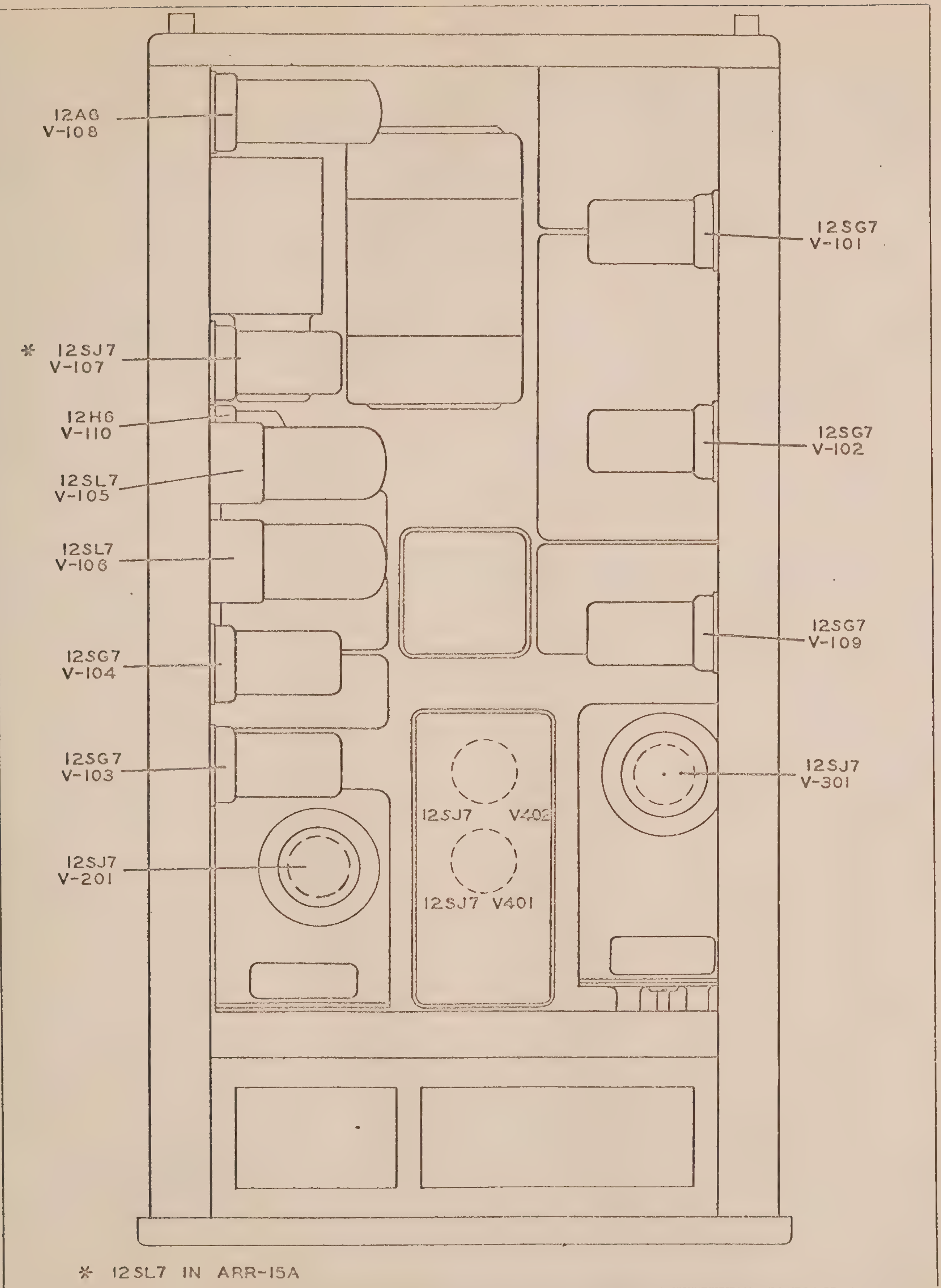


Figure 2-2. Tube Placement Diagram

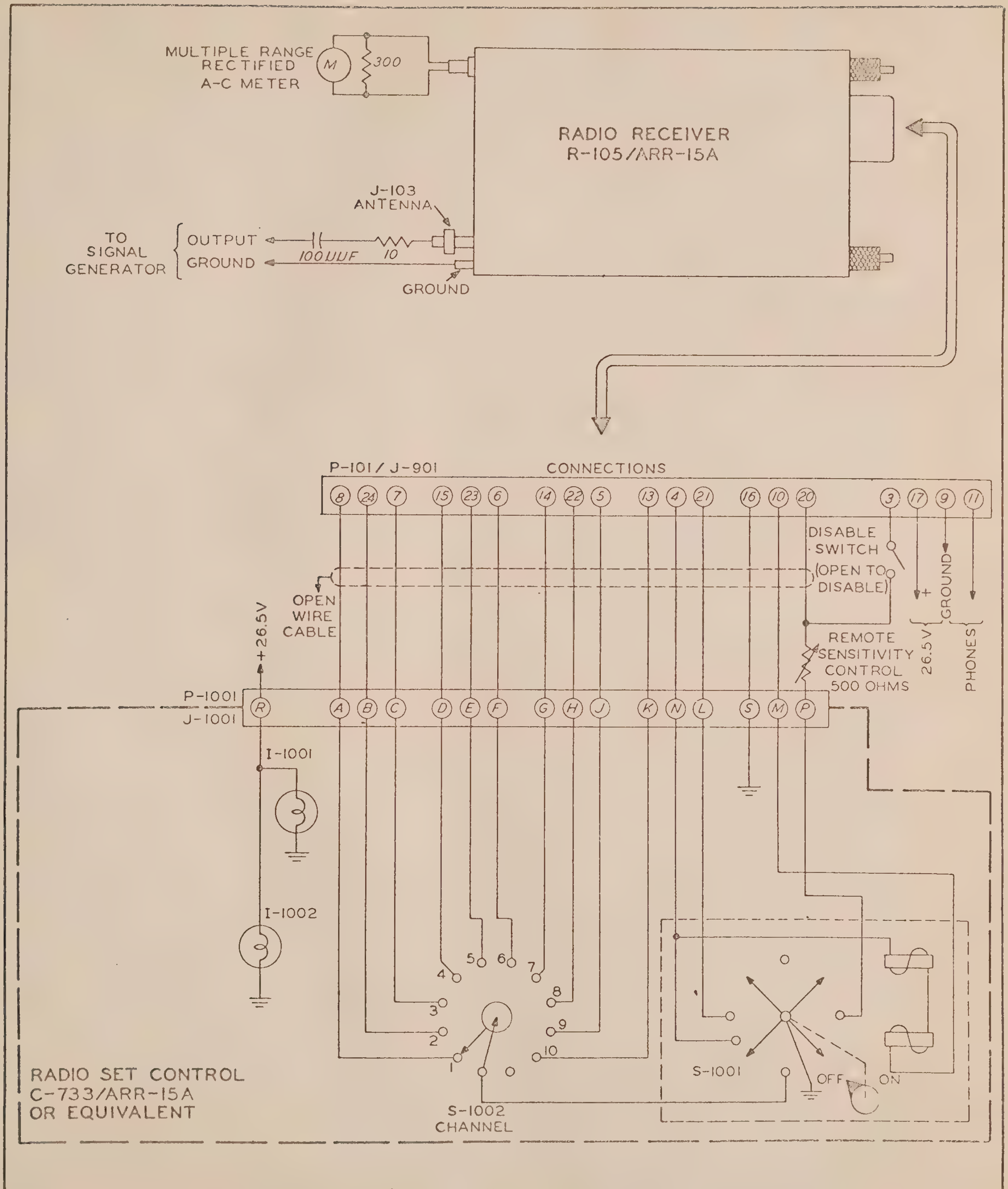


Figure 2-3. Test Bench Set-Up

(c) TEST BENCH SETUP.—If a number of installations are being made at one base it is desirable to make up a test bench so that each equipment may be checked before being mounted in the aircraft. Considerable time and labor may be saved if all units are checked and operating properly before being installed. *(Refer to figure 2-3 for a suggested test bench setup.)*

Use number 14 gauge wire for the power leads. Use number 18 gauge wire for the leads from the terminals numbered 4 and 10. Use number 22 wire for all the control leads.

(d) TEST PROCEDURE.—The following test procedure will reveal any damage that will affect the operation of the equipment.

1. Connect the power source to the proper terminals on the receptacle at the rear of the mounting base. *(See figure 2-3.)*

2. Connect the signal generator output to the ANTENNA terminal on the receiver through the dummy antenna. (Signal modulated 30% at 1000 cps.)

3. Connect the output meter to the receiver output circuit. (Either through the PHONES jack or by connecting to terminals on the rear of the unit.) If the voltmeter is used with 300 ohm shunt, calculate the power by using the following formula:

$$\text{Power (milliwatts)} = \frac{\text{voltage}^2}{0.3}.$$

4. Turn the signal generator on and set the frequency of the generator at 2.0 mc.

5. Rotate the ON-OFF switch to the ON position.

6. Rotate the VOLUME control clockwise as far as it will go.

7. Rotate the SENS control clockwise as far as it will go.

8. Rotate the BAND switch to A.

9. Turn the CW-MCW-CAL to MCW-CAL.

10. Adjust the TUNING control for maximum output. Check receiver operation by checking the sensitivity and selectivity at 2, 2.5, 3.5, 5.5, 8.5, 12.5, 15.0 and 18.1 mc. Refer to Paragraphs *(e) 1.* and *(e) 2.* below. Check by setting the signal generator to the above frequencies, tuning for maximum output and observing the input necessary to give a chosen output.

(e) MINIMUM ACCEPTABLE PERFORMANCE.

1. SENSITIVITY. — The conditions of measurement are: VOLUME control fully advanced, signal modulated 30 per cent at 1000 cps, phone reception with a rf input to the equipment not in excess of five microvolts and using a dummy antenna consisting of a 10 ohm non-inductive resistor and a 100 mmf capacitor in series. An audio output of 100 milliwatts shall be obtained at any frequency with an input of five microvolts.

The method of measuring sensitivity may be found in paragraph 1.*d.* (3) *(e)* on page 5-2.

2. SELECTIVITY.—The selectivity of the receiver at 18.1 megacycles per second shall fall within the maximum and minimum limits set forth below. (Conditions the same as stated above in Paragraph *(e)1.*):

Attenuation DB Below Resonance	Kilocycles Off Resonance Maximum	Kilocycles Off Resonance Minimum
6	9.0	7.5
20	14.5	7.5
40	22.5	7.5
60	30.0	7.5

The method of checking the selectivity is as follows:

a. Connect the signal generator through the recommended dummy antenna (100 mmf capacitor in series with 10 ohms) to the antenna terminal of the receiver.

b. Connect a 300 ohm loading device (with a db meter incorporated) to the output terminals of the receiver.

c. Turn the equipment ON and, with the BFO turned on, tune the receiver to zero beat with the output of the signal generator.

d. Apply 30% modulation to the signal generator and turn the BFO off. Adjust the signal generator output to just below the point where the receiver avc starts to operate.

e. Tune the signal generator either side of the test frequency until the output on the db meter reads the desired amount of attenuation as indicated in the table above.

f. Read the kilocycles-off-resonance as indicated by the signal generator dial and check with the Kilocycles Off Resonance column in the table above.

When the equipment has been carefully checked and all units are found to be operating satisfactorily, it may be installed in the aircraft. If the performance does not meet the minimum acceptable performance standards outlined above, refer to page 2-11 Paragraph 2.*e.* of this Section and attempt to adjust the controls so that the standards of performance can be met. If it is impossible to obtain the required performance by adjusting the controls, turn the unit over to the maintenance personnel for servicing.

b. INSTALLATION PROCEDURE.

(1) SELECTING MOUNTING POSITION FOR RECEIVER. *(See figure 8-2)*—A clearance of at least one-half inch must be allowed on the sides and at the top for the free movement of the unit on the shock mount. A minimum clearance of 18 inches in front of the receiver should be allowed to permit adjusting the controls. If the controls are not to be adjusted after the receiver is installed in the aircraft, a minimum clearance of four inches must be provided in front of the unit for installing and

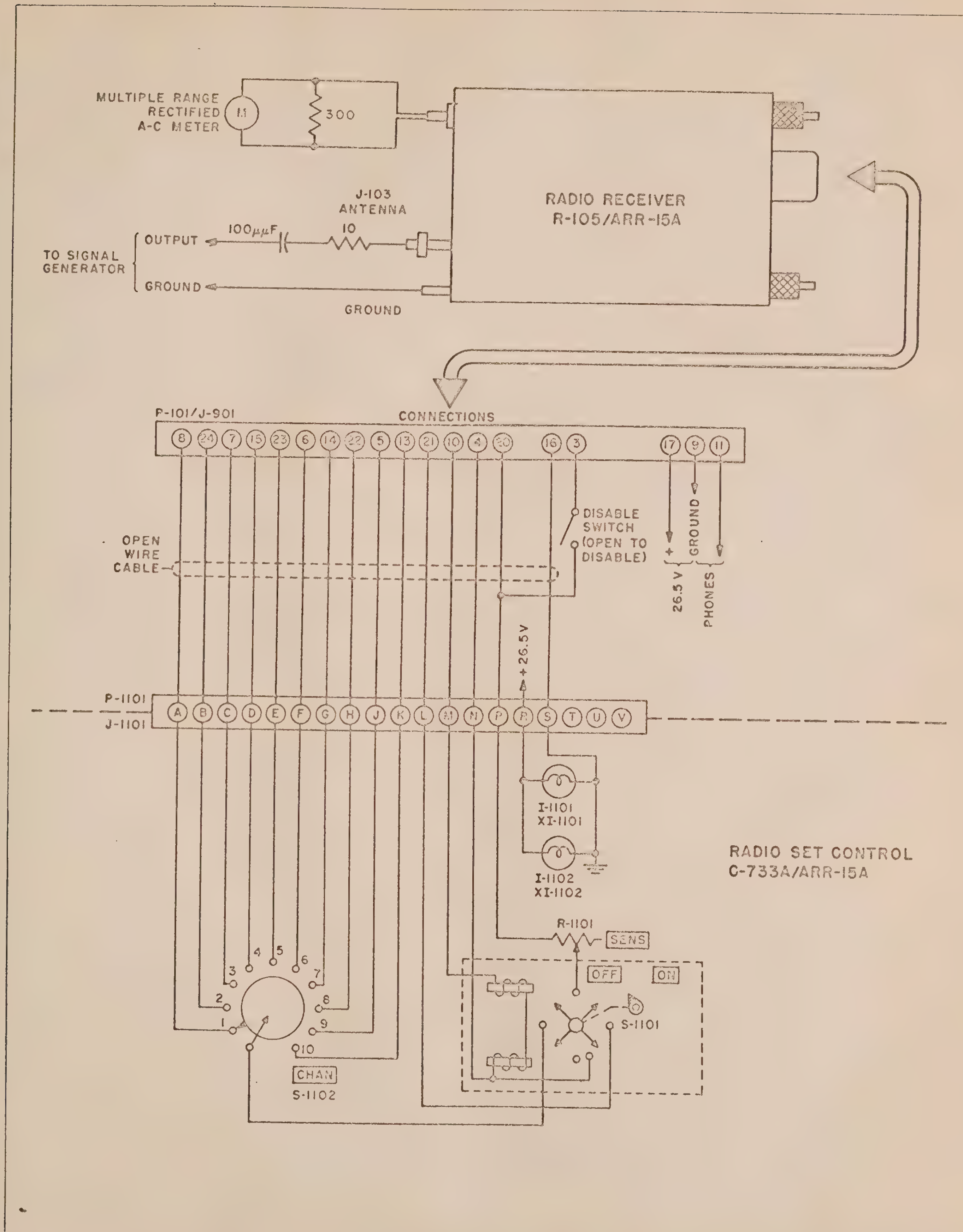


Figure 2-3A. Test Bench Set-Up, Radio Set Control C-733A/ARR-15A

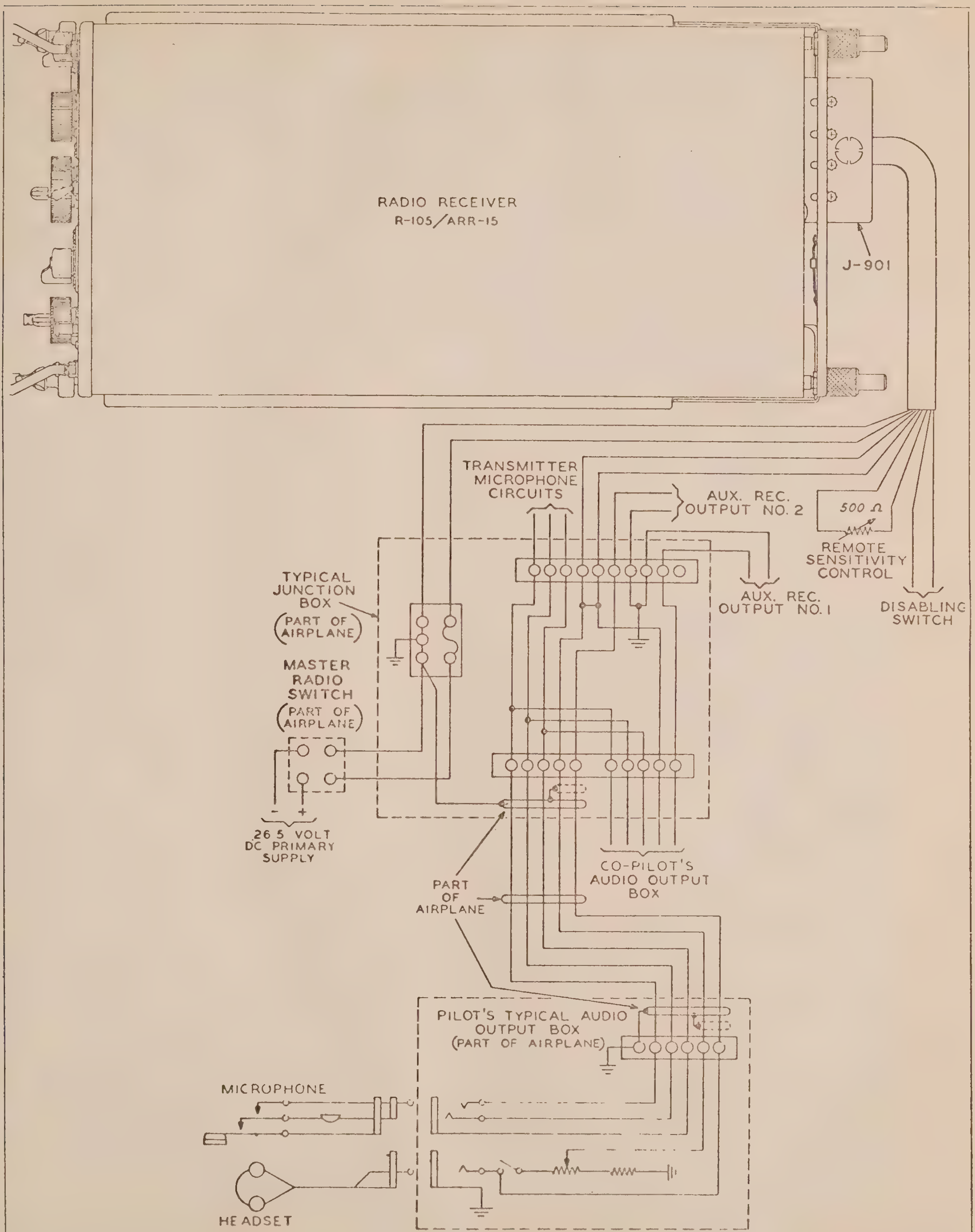


Figure 2-4. Cabling Diagram

removing the unit from the mounting base. A clearance of at least four inches behind the receiver is necessary for the removal of the connector plug from the shock mount if the cable comes through the rear of the plug. A clearance of three inches behind the receiver is sufficient if the cable does not come through the rear of the plug. There must be enough space either in front of or above the receiver to permit placing the unit on the mounting base.

(2) PLACING AND SECURING THE MOUNTING BASE. *(See figure 8-1 or figure 8-1A)*. — Use eight #10 screws for securing the mounting base to the aircraft. If a good connection to the structural parts of the aircraft is not obtained through the mounting base, a bonding strap may be connected from the mounting base to the aircraft or the ground connection may be made to the ground post on the front of the receiver. The ground connection should be as short as possible.

(2a) PLACING AND SECURING RADIO SET CONTROL C-733/ARR-15A OR RADIO SET CONTROL C-733A/ARR-15A. — Placement of the control box will vary with the type of aircraft and the kind of installation desired. Radio Set Control C-733/ARR-15A or Radio Set Control C-733A/ARR-15A is secured to the aircraft by 4 Dzus fasteners. Figure 8-2a gives all the information necessary for installing Radio Set Control C-733/ARR-15A; figure 8-2G for installing Radio Set Control C-733A/ARR-15A.

(3) POWER AND CONTROL CONNECTIONS.

(a) GENERAL. *(See figures 2-4 and 8-11)* — One or more control boxes or console control units may be used with this equipment. Nineteen terminals of the mounting base connector J-901 are used in making connections. *(See figure 8-10 for connector details.)* Terminals numbered 1, 2, 12, 18 and 19 are not used. It is recommended that wire strippers, long nose pliers, side cutting pliers, screwdriver, soldering iron and rosin core solder be available for making the connections.

(b) POWER INPUT CONNECTIONS. — Two number 14 gauge insulated wires long enough to reach from the receiver mounting base connector to the 26.5 volt d-c power source are required for the power connections. The positive connection is soldered to terminal number 17. The negative connection is soldered to terminal number 9. Do not expose any more of the bare wire than is necessary for the soldered connection.

(c) CONTROL LINE CONNECTIONS. *(See figure 8-11)* — Use number 18 gauge wire for the connections to terminals number 4 and 10 in the receiver mounting base connector. Use number 22 gauge wire for the control leads from the other terminals. Solder the wires into the connector terminals being careful not to strip the insulation from the wire any farther back than necessary for the soldered connection.

(4) PLACING AND SECURING THE RECEIVER ON THE MOUNTING BASE.

(a) PLACEMENT OF RECEIVER. — The mounting base has been designed to permit the removal of one receiver and the installation of another in the least possible time. After the mounting base has been installed and all connections to the mounting base connector have been made, the receiver may be fastened to the mounting base. Before placing the unit on the mounting base, be certain that the unit is securely fastened in the cabinet. Place the receiver on the mounting base and carefully push the unit toward the mounting base connector. Be certain that there is proper alignment between the connector on the receiver and the mounting base connector before exerting pressure on the front of the unit.

(b) SECURING RECEIVER. — When the receiver has been pushed back as far as it will go, lift the lock assemblies over the angles that protrude from the receiver front panel and tighten the wing nuts. Insert a piece of safety wire through one of the holes in the wing nut and through the hole in the screw between the wing nut and the round nut on the end. Twist the free ends of the wire together.

(5) ANTENNA SYSTEM CONNECTIONS.

(a) ANTENNA. — The receiver is designed for fixed aircraft antennas ranging from 17 to 40 feet in length. The lead-in from the antenna to the receiver should be as short and direct as possible. A minimum of two inches slack should be allowed to permit free movement of the receiver on the shock mounts. A binding post has been provided on the front panel of the receiver for the end of the lead-in.

(b) GROUND. — If a good connection to the structural part of the aircraft is not obtained through the mounting base, the ground connection may be made through a bonding strap between the mounting base and the aircraft or the ground connection may be made to the binding post on the front of the receiver. Make the ground lead as short as possible.

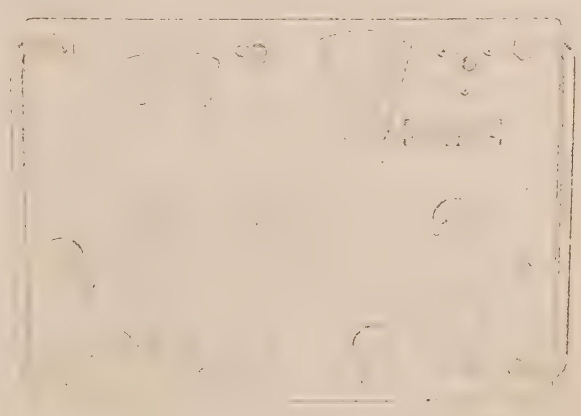


Figure 2-5. Panel Control Functions

Figure 2-5A. Remote Control Functions, Radio Set Control C-733/ARR-15A

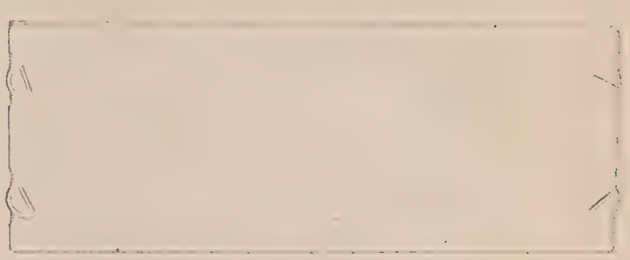


Figure 2-5B. Remote Control Functions, Radio Set Control C-733A/ARR-15A

c. ACCESSORIES. – Besides the basic unit, consisting of the receiver, mounting base and mounting base connector, the following accessories are necessary to complete a Radio Set AN/ARR-15 installation: headset, junction box, jack box and antenna. The headsets, junction box, jack box and antenna are furnished by the Government. Fixed aircraft antennas ranging from 17 to 40 feet in length are suitable. Refer to page 1-1 Section I, paragraph 3. for the Navy type designations applying to the headsets, junction box and jack box. The installation procedure for the accessories will vary considerably with the aircraft in which the equipment is being installed.

2. ADJUSTMENT.

a. GENERAL. – The adjustment of this receiving equipment consists principally of calibration and AUTOTUNE adjustment. When properly synchronized, no adjustment of the AUTOTUNE mechanism, except the unlocking, setting and locking of the BAND switch and TUNING control, is necessary. The AUTOTUNE mechanism is highly dependable and will only require synchronizing if some part of the mechanism has been replaced or removed for repair. The synchronizing of the mechanism is considered a maintenance operation rather than an adjustment operation. Complete instructions for the synchronizing of the AUTOTUNE mechanism are included in the MAINTENANCE section of this handbook.

Note

> To unlock the AUTOTUNE mechanism that operates the TUNING control and the BAND switch, rotate the locking keys two revolutions in a counterclockwise direction. Lock the controls by rotating the locking keys in a clockwise direction until the torque necessary to rotate the keys indicates that pressure is being applied to the stack of AUTOTUNE stop rings.

b. FUNCTION OF CONTROLS. – All of the receiver controls are mounted on the front panel. In each case a word or words have been engraved on the panel to indicate the function of the particular control. The controls mounted upon the panel of Radio Set Control C-733/ARR-15A are engraved with their function in a manner similar to that of the receiver. The following paragraphs give a brief outline of the elements in the receiver that are operated by each control:

(1) POWER ON-OFF SWITCH. – The power ON-OFF switches, located in the lower left-hand corner of the receiver panel, on the right-hand side of the panel of Radio Set Control C-733/ARR-15A *(figure 2-5A)*, and on the right-hand side of Radio Set Control C-733A/ARR-15A, are combination manually and electrically operated power and circuit control switches. Operation of one of the power ON-OFF switches to the ON position causes an electrical impulse to return the other power ON-OFF switch to the OFF position. When in the OFF position, this switch disables the

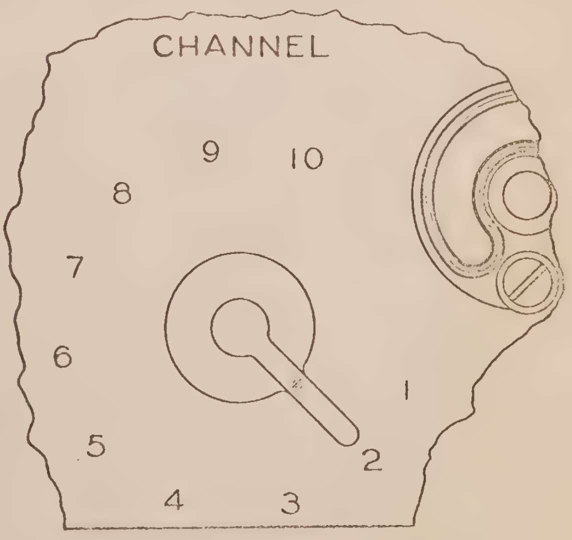


Figure 2-6. Channel Selector Details

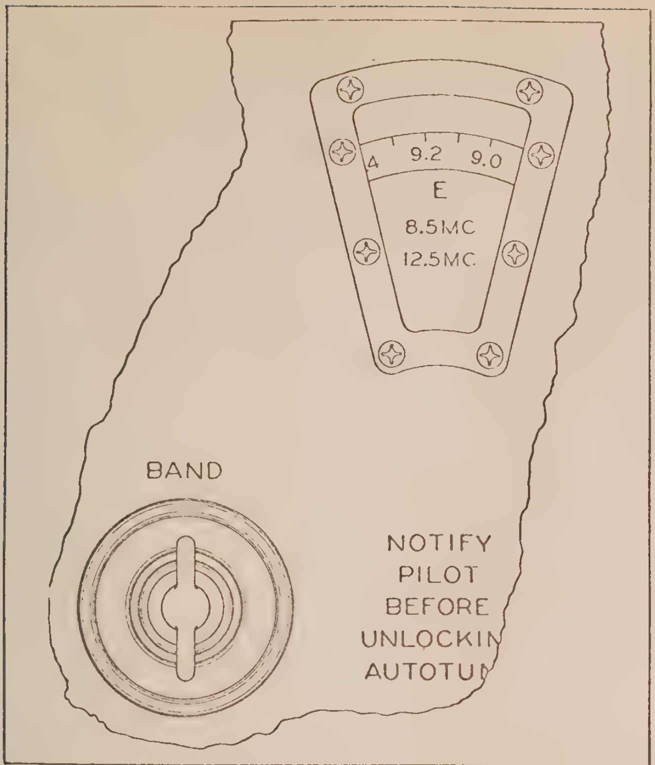


Figure 2-7. Band Switch Details

CHANNEL selector switch at that location. Control of the receiver is now available only at the station whose power ON-OFF switch is in the ON position. This condition continues until the other operator assumes control. When any power ON-OFF switch is in the ON position, special circuits remove the disabling voltage from the r-f amplifier, mixer and first i-f amplifier tubes, energize the MCW-CAL-CW switching circuit and close the primary power control relay.

(2) CHANNEL SELECTOR SWITCH. – The CHANNEL selector switch on the receiver is located on the lower left-hand corner of the panel. Figure 2-6 shows the general appearance of this switch. On Radio Set Control C-733/ARR-15A, and Radio Set Control C-733A/ARR-15A, a similar functioning but different appearing switch is located on the left-hand side of the panel *(figures 2-5A and 2-5B)*. Numerals are engraved upon the receiver panel, and upon the control knob of Radio Set Control C-733/ARR-15A, to correspond to the 10 AUTOTUNE channels upon which reception is available. These controls operate rotary wafer switches that are electrically connected to the AUTOTUNE control circuit.

(3) BAND SWITCH. – The BAND switch, *(figure 2-7,)* is connected to the AUTOTUNE Singleturn Unit and is used to select the band of frequencies that contain the one upon which reception is desired. The frequency range of the receiver, 1500 to 18,500 kc, is divided into six bands. The frequency band may be manually selected, if the AUTOTUNE

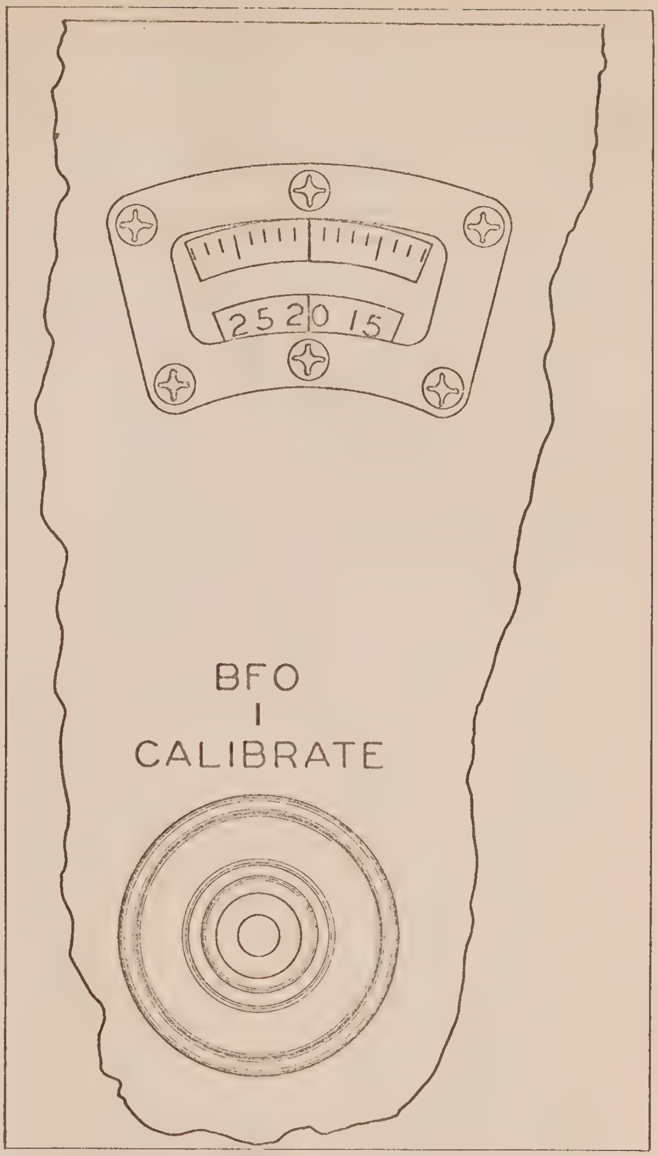


Figure 2-8. Calibrate and BFO Details

Singleturn Unit stop rings are unlocked, by rotating the locking key in a counterclockwise direction. The BAND switch operates a mechanism which selects the r-f coupling and r-f amplifier plate tank circuits that will tune to the band of frequencies in which reception is desired and selects the proper plate tank circuits for the high-frequency oscillator and frequency multiplier stages.

(4) BFO-CALIBRATE CONTROL. – This receiver has been provided with a system of calibration that permits the tuning of the receiver circuit to any exact frequency without having to tune for an incoming signal. The BFO-CALIBRATE control, *(figure 2-8,)* tunes the three i-f transformers and the beat frequency oscillator grid tank circuit by changing the positions of slugs within the inductors. The operation of this control also applies plate and screen voltages to the cfi (crystal-controlled frequency indicator,)

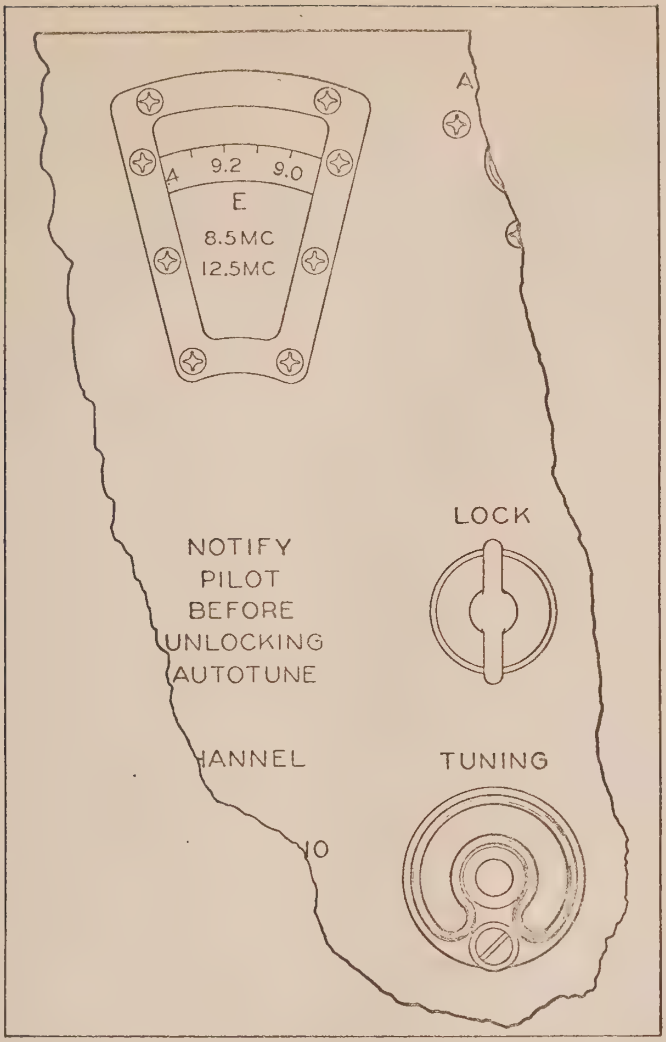


Figure 2-9. Frequency Indicator and Main Tuning Dial Details

oscillator tube, grounds the antenna terminal of the receiver, connects the output of the cfi oscillator to the input circuit of the receiver, disables the avc action, and connects a potentiometer in the cathode circuits of the r-f amplifier, mixer and first i-f amplifier tubes. The control may be rotated to vary the frequency of the oscillator 100 kc, 50 kc above and 50 kc below the intermediate frequency (500 kc).

(5) TUNING CONTROL. *(Refer to figure 2-9.)* — The r-f coupling, r-f amplifier plate tank, high-frequency oscillator grid and plate tank, and frequency multiplier plate tank circuits of this receiver are all tuned by varying the inductance of the circuits. The TUNING control, which is associated with the AUTOTUNE Multiturn Unit, operates a mechanism that controls the inductance in these circuits by determining the positions of slugs within the inductors. The control may be manually operated if the stop rings are unlocked. The control may be unlocked by rotating the locking key in a counter-clockwise direction.

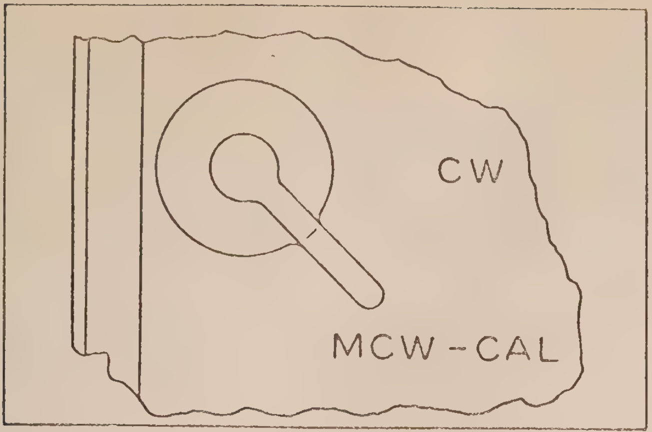


Figure 2-10. CW-MCW-CAL Selector Details

(6) MCW-CAL-CW SWITCH. — *(Refer to figure 2-10).* When it is desired to receive either mcw or voice modulated signals this switch should be set at the MCW-CAL position. When the switch is in the MCW position the avc circuit is operative and a variable "T" pad is connected between the output of the audio amplifier and the PHONES jack. When the switch is set at the CW position the avc circuit is partially disabled, the output of the audio amplifier is coupled directly to the phones jack, and the volume is controlled by a cathode potentiometer as explained above.

(7) VOLUME CONTROL. — This control operates two sections of variable resistors, a bridged "T" pad and a potentiometer. The "T" pad is connected between the output of the audio amplifier and the PHONES jack whenever mcw reception is selected. When cw reception is selected, a potentiometer is connected in the cathode circuits of the r-f amplifier and first i-f amplifier tubes. When mcw reception is selected the potentiometer is shorted out.

(8) SENS CONTROL. — The threshold sensitivity is controlled by the screwdriver adjustment marked SENS. *(See figure 2-11.)* This control is connected in series with the cathodes of the r-f, mixer and i-f stages in the receiver for the purpose of adjusting the sensitivity of the receiver to operate most satisfactorily under conditions of electrical interference. A dust cover is placed over the panel opening behind which this control is located. The SENS control on Radio Set Control C-733A/ARR-15A is adjusted by a knurled knob. It functions exactly as that located on the receiver.

c. PRINCIPLE OF OPERATION. — This receiver employs a superheterodyne circuit with one stage of r-f amplification and two stages of i-f amplification. The i-f transformers are variable and will tune to frequencies in the range 450 and 550 kc. The variable characteristics of these transformers is used only during the calibrating of the receiver. When the receiver has been calibrated and it is desired to receive a transmitted signal, the i-f transformers are adjusted so that the intermediate frequency is exactly 500 kc. Therefore the actual intermediate frequency, as used for reception is 500 kc. For calibration, and excitation purposes three oscillators have been incorporated into this receiver. The frequency of one oscillator circuit is determined by a 100 kc quartz crystal. Harmonics of this 100 kc signal are used when calibrating the receiver. During actual reception this oscillator circuit is disabled by removing the plate and screen voltage from the oscillator tube.

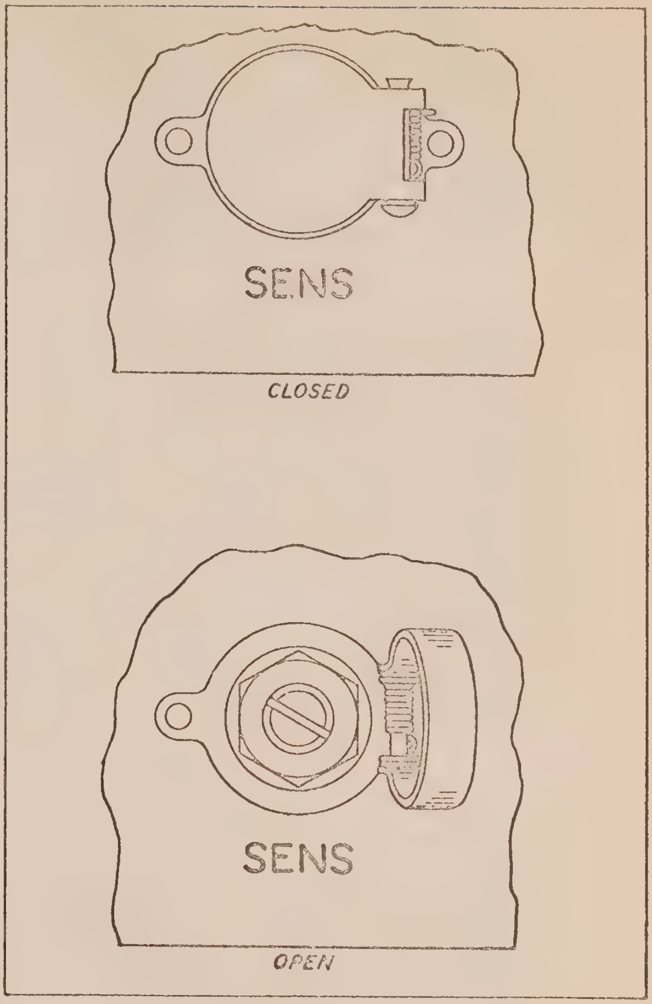


Figure 2-11. Sensitivity Adjustment Details

The frequency converting stage of this receiver is separately excited. One of the variable frequency oscillators is used to excite the mixer tube. This oscillator operates in the frequency range 2000 to 3000 kc and a frequency multiplier circuit is used to obtain the higher frequency excitation voltages. The remaining oscillator tube is essentially a beat frequency oscillator, but is also used during the calibration of the receiver. The output of this oscillator is in the frequency range 450 to 500 kc.

When voice modulated or mcw signals are being received, the beat frequency oscillator circuit is disabled by removing the plate and screen voltages from the oscillator tube.

Two stages of audio amplification provide ample output for the operation of headphones at the receiver and for the operation of headphones at the remote control positions. One triode connected pentode tube is used for the first audio stage. The audio output stage is a type 12A6 pentode.

The noise silencer, following the detector, employs two tubes. A dual triode type tube is connected in an accelerated avc circuit. The avc circuit is operative when voice modulated or mcw signals are being received. The circuit is partially disabled if cw reception is selected and during the time that the receiver is being calibrated.

(1) GENERAL ADJUSTMENTS TO PREPARE THE EQUIPMENT FOR OPERATION. (*See figure 2-5.*)—Before proceeding with the adjustments, choose the 10 frequencies upon which the receiver is to be operated. A brief outline of the control adjustments necessary for the preparation of this receiver for routine operation is given below:

(*a*) Operate the Power Switch to the ON position.

(*b*) Operate the CHANNEL Selector switch to Position 1.

(*c*) When the AUTOTUNE cycle has been completed, unlock the stop rings on the AUTOTUNE Singleturn and Multiturn Units by rotating the locking keys two revolutions in a counterclockwise direction.

(*d*) Rotate the BAND Switch to the correct position for the frequency that has been selected for Channel 1.

(*e*) Rotate the TUNING Control until the dial indicates the frequency upon which reception is desired.

(*f*) Rotate the CALIBRATE Control a number of dial divisions corresponding to the last two digits and fractions thereof of the desired frequency.

(*g*) While listening to the output of the receiver, rotate the TUNING Control about the desired frequency until zero beat is obtained.

(*h*) Lock the BAND and TUNING Controls by rotating the locking keys clockwise until the AUTOTUNE stop rings are tight.

(*i*) Return the CALIBRATE Control to exact "0" setting.

(*j*) Select the type of reception desired with the CW-MCW switch.

(*k*) Repeat steps (*c*) thru (*i*) for the remaining nine frequencies.

Note

If it is desired to receive voice-modulated signals, operate the CW-MCW-CAL switch to the MCW position.

d. CALIBRATION.

(1) CALIBRATION THEORY.—The Calibrator that is incorporated in this receiving equipment utilizes a crystal controlled oscillator, a variable frequency oscillator and a variable frequency i-f channel. Using the above circuits, the receiver may be accurately tuned to any frequency in the range 1500 to 18,500 kc without having to follow the usual procedure of tuning for a transmitted signal or depending upon tuning dial calibration.

The system depends primarily upon the frequency stability of the cfi unit (crystal controlled frequency indicator) and the frequency stability of the two variable frequency oscillators. The frequency of the cfi oscillator is controlled by a 100 kc quartz crystal. The variable frequency oscillators are precision built and are exceptionally stable. The beat frequency oscillator has been carefully calibrated and should always indicate the proper number of kilocycles of deviation from the 500 kc intermediate frequency. The frequency of the beat frequency oscillator is varied by operating the BFO-CALIBRATE control. This control operates a mechanism which changes the position of the tuning slugs within the low frequency osc. grid inductor and the tuning slugs within the i-f transformers.

During the process of receiver calibration the frequency of the output of the low frequency osc. is set and the frequency of the high frequency oscillator is varied. It is most important that this procedure be followed. The frequency of the high frequency oscillator is varied as the TUNING control is rotated. In order to determine the correct setting of the tuning control for any particular frequency, a condition must be reached where the frequency of the output of the mixer stage is the same frequency as the output of the lf osc.

In the calibration position the output of the cfi is fed into the receiver input circuit and the antenna terminal is grounded by the operation of K-502. All harmonics of the 100 kc oscillator are fed into the receiver but tunable band pass filter circuits in the r-f amplifier and mixer stages attenuate all signals except the harmonic that is used for calibration. Although attenuated, the 100 kc harmonic that is to be used will be of sufficient strength to drive the signal grid of the mixer even when the band pass filter and tank circuits are detuned as much as 50 kc. The hf oscillator tank and multiplier tank circuits are tuned by the same control that tunes r-f amplifier and mixer tank circuits. A 100 kc harmonic of the cfi oscillator is used for calibration 50 kc above and 50 kc below the point. When the r-f amplifier, mixer and exciter circuits are tuned farther than 50 kc away from a 100 kc point, the 100 kc harmonic that is nearest to the frequency to which the r-f, mixer and exciter circuits are tuned becomes the usable signal. The frequency of the exciter output will vary as the TUNING control is rotated but will always be between 450 and

550 kc higher or lower in frequency than the 100 kc harmonic signals. When receiving signals in BAND A, C, or D, the frequency of the input signal is lower than the exciter frequency. When receiving in BAND B, E, or F, the frequency of the input signal is higher than the exciter frequency. With the i-f transformers tuned to the same frequency as the frequency of the output of the beat frequency oscillator, the output of the mixer will be permitted to reach the detector tube when the frequency of the output of the mixer is near the frequency of the output of the low frequency oscillator. Zero beat between these two signals indicates that the output of the mixer is exactly the same frequency as the frequency of the output of the low frequency osc. The receiver is properly calibrated when zero beat between these two signals is obtained.

(2) CALIBRATION PROCEDURE.— As indicated in the paragraphs above, the first step in the calibration procedure is to set the frequency of the beat frequency oscillator. In brief, the procedure from this point consists of setting the position of the TUNING control so that the output of the mixer is of the same frequency as the output of the low frequency osc. *Under no circumstances should the TUNING control be set and the BFO-CALIBRATE used as the variable when calibrating the receiver.*

The calibration procedure and functioning of the circuits during calibration are best explained by using an example. If, for instance, 2125 kc is selected as the frequency to which it is desired to tune the receiver, the procedure outlined below should be followed:

(a) STEP-BY-STEP PROCEDURE.

1. Operate the Power Switch to the ON position.

2. Select the AUTOTUNE channel upon which it is desired to calibrate the receiver.

3. When the AUTOTUNE cycle has been completed unlock the stop rings on the Multiturn and Singleturn Units by rotating the locking keys two revolutions in the counterclockwise direction.

4. Operate the BAND switch to the position that includes the frequency 2125 kc (Band A).

5. Rotate the TUNING control until the dial indicates 2.125 mc.

6. Rotate the BFO-CALIBRATE control until the dial indicates 25.

Note

The BFO-CALIBRATE control should always be set so that the calibration dial indicates the last two digits of the frequency in kilocycles upon which it is desired to calibrate the receiver. If it is desired to calibrate the receiver within a fraction of a kilocycle of a frequency, the BFO-CALIBRATE control should be set so that the calibration dial indicates the last three digits of the frequency including the decimal.

7. With the beat frequency oscillator set as described above and while listening to the output of the receiver, rotate the TUNING control about the 2125 kc point until zero beat between the output of the mixer and the output of the bfo is obtained.

8. Carefully lock the BAND and TUNING controls by rotating the locking keys in a clockwise direction until the AUTOTUNE stop rings are tight.

9. Rotate the BFO-CALIBRATE control back to the "0" setting.

CAUTION

The BFO-CALIBRATE control must be returned to exact zero so that the receiver input circuit will be reconnected to the antenna terminal, the cfi oscillator will be disabled and the i-f channel will be returned to 500 kc. The receiver is now calibrated for 2125 kc on this particular AUTOTUNE channel. The type of reception may be selected by operating the MCW-CAL-CW switch. If it is desired to receive voice modulated signals the switch should be operated to the MCW-CAL position. The AUTOTUNE mechanism will reposition the controls to tune the receiver to 2125 kc whenever this channel is selected.

e. TUNING ADJUSTMENTS.

WARNING

This equipment employs voltages (250 volts) which are dangerous and may be fatal if contacted by operating personnel. Extreme caution should be exercised when working with the equipment with the cabinet removed. Be certain that the ON-OFF switch is in the OFF position and that the dynamotor has stopped rotating before touching any of the components. When making measurements with the equipment operating and the cabinet removed use dry well-insulated prods.

(1) ADJUSTMENT PROCEDURE—If it is desired to change the frequency of one or more of the AUTOTUNE channels follow the procedure outlined below:

(a) With the Power Switch in the ON position, operate the CHANNEL Selector Switch to the number corresponding to the channel that is to be changed.

(b) When the AUTOTUNE cycle has been completed unlock the AUTOTUNE stop rings by rotating the locking key on the BAND Switch Control and the locking key above the TUNING Control two revolutions in a counterclockwise direction.

(c) Operate the BAND Switch to the band that contains the frequency upon which reception is desired.

(*d*) Rotate the TUNING Control until the main dial indicates the desired frequency.

(*e*) Rotate the BFO-CALIBRATE Control so that the calibration dial indicates the last two digits of the frequency desired.

(*f*) While listening to the output of the receiver, rotate the TUNING Control about the original setting and carefully set the control so that zero beat is obtained.

(*g*) Carefully lock the AUTOTUNE stop rings by rotating the locking keys in a clockwise direction until tight.

(*h*) Return the BFO-CALIBRATE Control to the "0" setting.

Repeat the above procedure for as many channels as it is desired to reset.

CAUTION

When locking the AUTOTUNE Controls do not use any instruments. Use only the thumb and forefinger and tighten until the torque necessary to rotate the keys indicates that pressure is being applied to the stack of AUTOTUNE stop rings.

(2) AUDIO ADJUSTMENTS.

(*a*) VOLUME.—There are two methods of controlling the level of the audio output of the receiver. For cw reception a rheostat, located in the cathode circuits of the r-f amplifier and first i-f amplifier tubes, is used to vary the bias on the tubes there by controlling the receiver output. For mcw-cal (MCW-CAL position also used for phone) reception a bridge T pad is used and the rheostat is short circuited. The bridge T pad is connected between the output winding of the audio output transformer and the PHONE jack. The rheostat and bridge T pad are connected to the same shaft and are operated by the VOLUME control located on the front panel. The bridge T pad is not connected in the circuit when cw emission is selected. When adjusting the VOLUME control, the main consideration is understandability and comfort. The automatic volume control circuit will maintain the audio output level within close limits on most signals.

(3) THRESHOLD SENSITIVITY ADJUSTMENT.—A rheostat, connected in series with the receiver r-f amplifier tube and first i-f amplifier cathodes, is used to adjust the sensitivity of the receiver. This control, adjusted through a hole in the front panel by a straight lipped screwdriver, is adjusted for best signal to noise ratio for each individual installation. The adjustment should be made with the airplane engine running and the receiver turned ON and completely adjusted but no signal being received. Proceed as follows to complete the adjustment.

(*a*) Operate the CW-MCW-CAL selector switch to MCW-CAL position.

(*b*) Rotate the VOLUME control to the full ON position.

(*c*) Engage the screwdriver slot in the end of the SENS adjustment shaft with a straight lipped screwdriver.

(*d*) Adjust the SENS control clockwise or counterclockwise until the condition of maximum tolerable noise level from electrical interference is encountered.

(*e*) If the interference is not great enough to cause discomfort to the operator at any setting of the control, the control should be rotated to the full ON position (extreme clockwise position).

(4) ADJUSTMENT FOR OPERATION.—When making the TUNING adjustments as described above it must be kept in mind that these adjustments must be carried out for each of the ten channels.

Note

Each AUTOTUNE control must be securely locked before changing channels. The control setting will be lost if the control is allowed to rotate without first locking the stop ring with the locking key.

f. PRE-FLIGHT TEST.

(1) FREQUENCY.—If a frequency standard is available, the receiver can be checked for accuracy of calibration against the standard. However, in many instances a frequency standard will not be available, therefore it will be necessary to become familiar with frequencies of various other broadcasting services such as control tower transmitters, fixed services or broadcasting stations. If such checks are not satisfactory, other transmitters in the immediate vicinity may be used to check the receiver calibration. The equipment should be checked on at least two frequencies on each position of the BAND switch, preferably near the upper and lower frequency limits.

BAND vs FREQUENCY

BAND	FREQUENCY
A	1.5 to 2.5 mc
B	2.5 to 3.5 mc
C	3.5 to 5.5 mc
D	5.5 to 8.5 mc
E	8.5 to 12.5 mc
F	12.5 to 18.5 mc

(2) RECEIVER SENSITIVITY.—If a signal generator and output meter are available, the sensitivity of the receiver should be checked on all

positions of the BAND switch. Refer to Page 2-1 Paragraph 1. for the test procedure and the instruments required. The sensitivity measurement conditions are the input value of a 1000 cps 30% modulated signal which results in a six db signal to noise ratio or a 100 mw output, whichever occurs first. Under these conditions sensitivity varies between one uv and two and one-half uv. Average sensitivity is approximately two and one-half uv. If no sensitivity measuring equipment is available, the receiver may be compared with other identical installations, or signals of known reliability can be tuned in and compared. The sensitivity should be checked in at least two positions of the TUNING dial on each range of the BAND switch, preferably near each end of the TUNING range. In event no signals are available for reception, the equipment can be checked by rotating the CW-MCW-CAL control to the MCW-CAL position and listening to the 100 kc signal from the cfi unit. A good signal should be encountered over the complete tuning range of the receiver at every 100 kc. The results of pre-flight test may be checked against typical readings included below.

SENSITIVITY: Typical Meter Readings

BAND	FREQUENCY MC	INPUT UV	OUTPUT MW
A	2.0	2.4	100
B	3.0	2.0	100
C	4.5	2.5	100
D	7.0	2.5	100
E	10.0	2.3	100
F	15.5	2.5	100

g. FLIGHT TEST.—Due to conditions arising when the airplane is in flight, it is suggested that the equipment be checked as soon as the airplane clears the flight deck. Contact with the radio room of the carrier on phone emission on one channel should disclose any defects due to vibration or noise originating from the airplane.

SECTION III
OPERATION

This section contains only the steps that are necessary to control the equipment for routine operation and the actual operations necessary in order to make minor adjustments. All adjustments are outlined in brief form and it is suggested that the operator refer to the ADJUSTMENT section (Section II paragraph 2) of this handbook for a more detailed explanation of the procedure for the adjustment of the receiver circuits and the AUTOTUNE system.

1. STARTING THE EQUIPMENT.

a. PROCEDURE.

(1) Rotate the ON-OFF switch on the receiver front panel or the ON-OFF switch on any remote control unit in a clockwise direction until it catches.

2. STOPPING THE EQUIPMENT.

a. PROCEDURE.

(1) RECEIVER. — Push the ON-OFF control all the way in toward the panel.

(2) RADIO SET CONTROL C-733/ARR-15A. —Rotate the ON-OFF control counterclockwise as far as it will go to unlock the control and push the button in the center toward the panel. The switch will snap to the OFF position.

Note

The operator of this radio equipment should become familiar with a means of disconnecting the equipment from the power

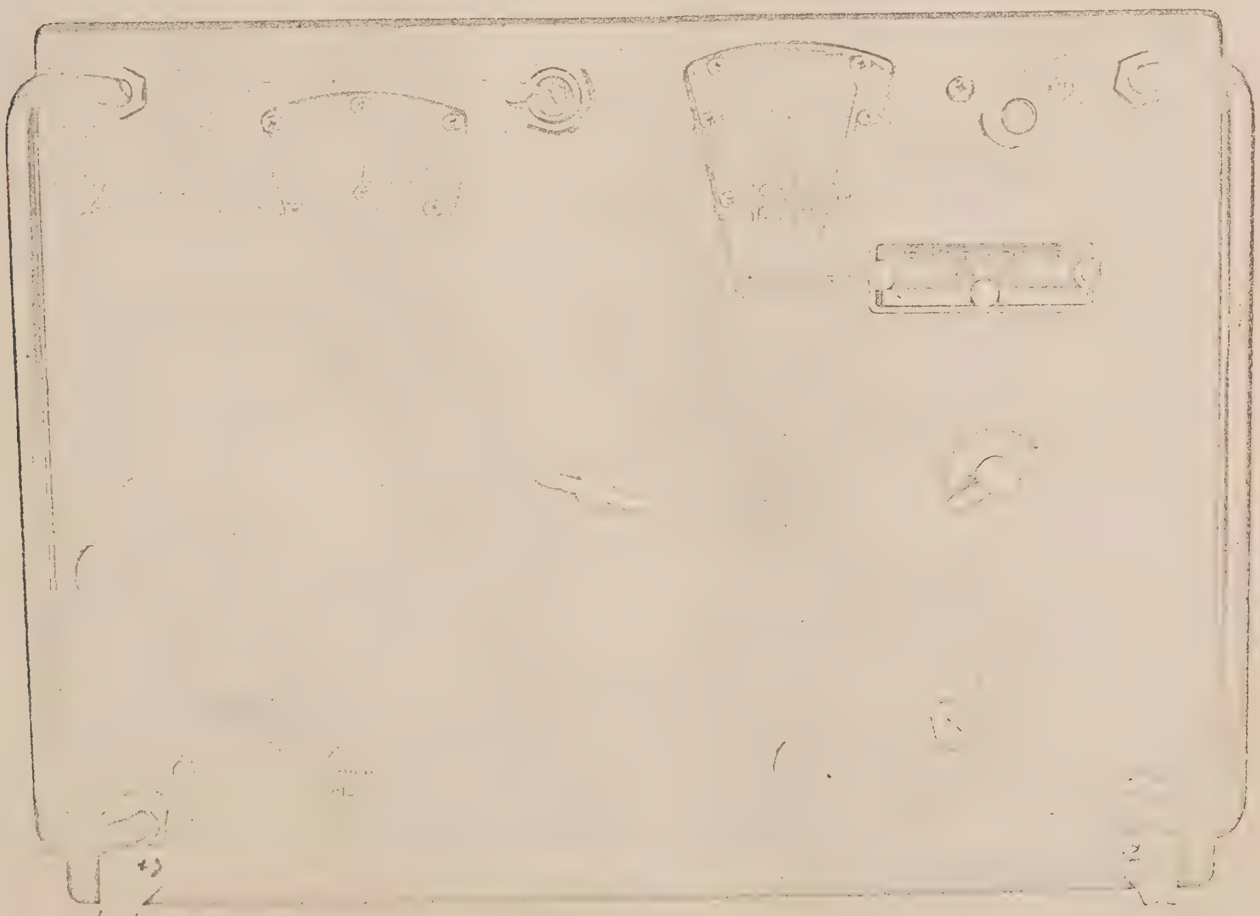


Figure 3-1. Panel Control Functions

Figure 3-1A. Remote Control Functions, Radio Set Control C-733/ARR-15A

source, such as a main supply switch or circuit breaker, in case an emergency shut down is necessary.

3. GENERAL.

a. FUNCTION OF THE EQUIPMENT. – This receiver is designed to receive voice, cw and mcw signals within the frequency range of 1500 to 18,500 kc. Ten pretuned channels can be selected simply by operating a CHANNEL selector switch. Manual operation is possible by unlocking the tuning controls and allowing the stop rings of the AUTOTUNE heads to slip. One pre-tuned channel setting will be destroyed by this method and will have to be reset before automatic tuning can be again used on this channel.

Note

The AUTOTUNE controls must be locked before automatic channel selection is attempted. Failure to lock the control will result in the dial settings being lost.

b. NOTES ON OPERATION.

(1) Placing the CW-MCW-CAL selector in the CW position allows cw reception.

(2) Placing the CW-MCW-CAL selector in the MCW-CAL position allows mcw-cal and phone reception.

(3) After the controls have been locked it is good practice to check the locking keys frequently to make certain that they are tight.

(4) If the receiver has been turned off, allow at least one minute for the tubes to rise to operating temperature.

(5) Correct errors in tuning or adjustment of the equipment as soon as possible after discovery.

Figure 3-1B. Remote Control Functions, Radio Set Control C-733A/ARR-15A

4. ROUTINE OPERATION.

If the receiver circuits have been tuned and the controls locked for all 10 frequency channels, the procedure outlined below should be followed during routine operation.

a. PANEL CONTROL. – *(See figure 3-1)*

(1) Insert the headphones cord plug into the PHONES jack.

(2) Rotate the ON-OFF switch to the ON position.

(3) Select the AUTOTUNE channel corresponding to the frequency upon which reception is desired.

(4) Rotate the CW-MCW-CAL selector switch to the position corresponding to the type of reception desired.

(5) Regulate the audio level with the VOLUME control.

(6) Press the ON-OFF control to turn the receiver off.

b. REMOTE CONTROL. – *(See figure 3-1A or figure 3-1B)*

(1) Connect headphones to audio output box.

(2) Rotate the ON-OFF switch to the ON position.

(3) Rotate CHANNEL switch to number corresponding to the AUTOTUNE channel upon which reception is desired.

Note

All channels must be set up to receive the same type of mission when the receiver is to be operated from a remote point. The CW-MCW-CAL selector switch on the receiver must be set for the type of emission selected.

(4) Regulate the audio level with the volume control on the audio output box.

(5) On Radio Set Control C-733A/ARR-15A, adjust the SENS control *(figure 3-1B)* for best reception.

(6) To turn the equipment off, rotate the ON-OFF control on Radio Set Control C-733/ARR-15A counterclockwise as far as it will go to unlock the

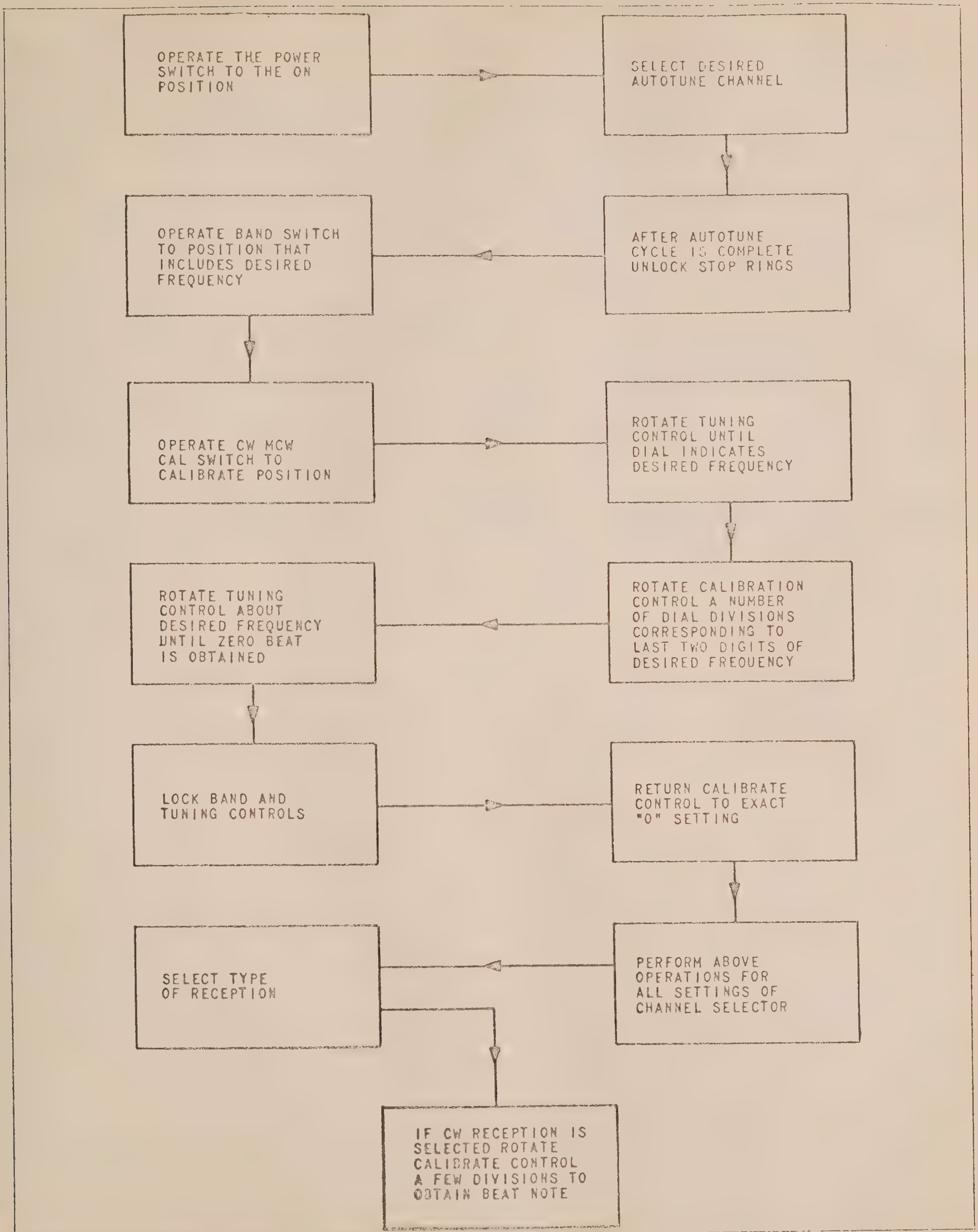


Figure 3-2. Operating Sequence Block Diagram

control and press the knob in the center toward the panel. The switch will snap to the OFF position.

5. TUNING ADJUSTMENTS.

If it is desired to change the frequency of one or more of the AUTOTUNE channels follow the procedure outlined below: *(See figure 3-2)*

CAUTION

Do not unlock any AUTOTUNE unit until the pilot has been notified not to take control. (When receiver is connected for remote operation.)

a. With the power switch in the ON position, operate the CHANNEL selector switch to the number corresponding to the channel that is to be changed.

b. When the AUTOTUNE cycle has been completed unlock the AUTOTUNE stop rings by rotating the locking key on the BAND switch control and the locking key above the TUNING control two revolutions in a counterclockwise direction.

c. Operate the BAND switch to the band that contains the frequency upon which reception is desired and set the CW-MCW-CAL switch on the MCW-CAL position.

d. Rotate the TUNING control until the main dial indicates the desired frequency.

e. Rotate the BFO-CALIBRATE control so that the calibration dial indicates the last two digits of the frequency desired.

f. While listening to the output of the receiver, rotate the TUNING control about the original setting and carefully set the control so that exact zero beat is obtained.

g. Carefully lock the AUTOTUNE stop rings by rotating the locking keys in a clockwise direction until tight.

h. Return the CALIBRATE control to the "0" setting.

Note

If cw reception is selected rotate CALIBRATE control a few dial divisions until peak audio output is obtained.

Repeat the above procedure for as many channels as it is desired to reset.

Note

All channels must be set up to receive the same type of emission when the receiver is to be operated from a remote point.

SECTION IV
THEORY OF OPERATION

1. MECHANICAL CHARACTERISTICS.

a. GENERAL. — Radio Receiver R-105/ARR-15 is constructed in such a fashion that servicing can be accomplished with a minimum of effort. Plug-in units are employed where the use of such units would be of advantage. The cfi unit, the relay unit, the dynamotor unit and the filter unit are all plug-in units. The dynamotor unit is removed by removing the locking wires and disengaging the slide fasteners after which the dynamotor can be pulled straight up and out of the connector. Connections to the cfi, lfo and hfo units are by plug connectors which can be removed without the use of tools. The actual removal of the units require the use of tools, however. Since the procedure is important, refer to the MAINTENANCE section of this book for details on removing these units.

b. AUTOTUNE MECHANISM.

(1) GENERAL. — The Autotune system consists of a group of positioning mechanisms. The positioning mechanisms are connected to tuning elements within the equipment. Each mechanism is provided with a tuning knob so that the elements may be adjusted manually. Each positioning mechanism provides precise angular setting of the tuning element with which it is associated. The position of the tuning element with respect to the mechanism is readily adjustable and the setting for each control is entirely independent of the other controls. Locking bars, located on each tuning dial, lock the tuning element to the mechanism for each predetermined setting of the control.

The accuracy of positioning of the Autotune system is of a very high order. Each setting is inherently independent of wear, backlash, alignment, line voltage, etc. The accuracy of resetting of the tuning elements is comparable to that obtainable with vernier manual controls. All parts are machined within close limits and although operation is most precise there are no delicate adjustments or fragile mechanisms.

The Autotune system that is employed in this equipment consists of a motor, a singleturn unit, a multiturn unit, a control unit, a line shaft, drive gears and the necessary electrical control circuit components. The singleturn and multiturn units are provided with tuning knobs to permit the manual adjustment of the receiver circuit elements with which the units are associated. If given a reasonable amount of care and attention the mechanism will give long periods of trouble free service. Refer to the MAINTENANCE section of this Handbook.

In operation, a channel is selected by the channel selector switch which completes the circuit to the control unit. The control unit is the mechanism which sets the motor and the Autotune elements in motion and selects the right combination of mechanical sequences which will end up with the Autotune units positioned for the channel selected. After the control unit has functioned as just mentioned, the Autotune units connected to the tuning elements are rotated and stopped at the precise position to which they were pre-set. The control unit completes the operation by turning the motor and associated apparatus off. The following paragraphs give a detailed functional description of the Autotune system. The numbers appearing under the heading "Identifying Number" and "Operates On" refer to the numbers that are used to identify the parts on the illustrations.

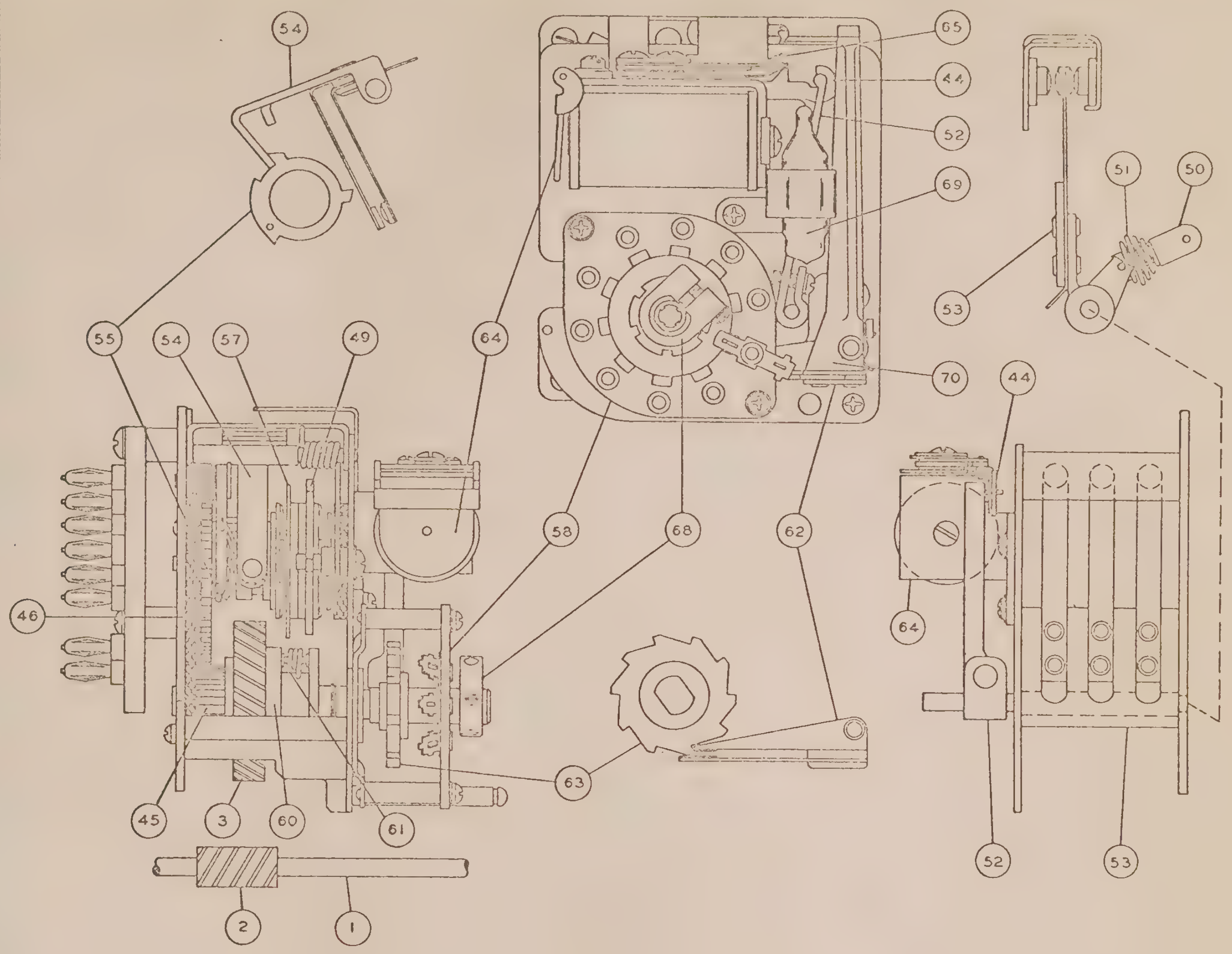
The direction of rotation is stated as viewed from the front of the receiver.

(2) CONTROL UNIT. *(See figure 4-1.)*

(a) BREAKER CAM (63) AND SEEKING SWITCH (58).—The seeking switch has ten switch contacts, one for each of the ten available frequency channels. Selection of any channel will result in the seeking switch rotating until the switch rotor reaches an open contact. The open contact will correspond to the channel that was selected. The rotation of the seeking switch is in a counterclockwise direction due to the ratchet drive. The switch does not rotate during the last half of the Autotune cycle. The breaker cam is used for fine adjustment of the seeking switch.

Functional Sequence Number	Identifying Number	FUNCTIONAL DESCRIPTION OF PART	Operates on Number
		Timing Switch Cam	
1	(1)	Line Shaft	(2)
2	(2)	Drive Worm	(3)
3	(3)	Worm Gear	(60)
4	(60)	Seeking Switch Ratchet Dog	(61)
5	(61)	Seeking Switch Ratchet Tooth	(63)
6	(63)	Breaker Cam	(62)
		Seeking Switch	
1	(1)	Line Shaft	(2)
2	(2)	Drive Worm	(3)
3	(3)	Worm Gear	(60)
4	(60)	Seeking Switch Ratchet Dog	(61)
5	(61)	Seeking Switch Ratchet Tooth	(58)
6	(58)	Seeking Switch	

(b) AUTOTUNE MOTOR CONTROL SWITCH (53) AND STARTING RELAY CON-



KEY TO SYMBOLS FOR CONTROL UNIT, MULTITURN UNIT AND SINGLETURN UNIT

1. Line Shaft
2. Drive Worm
3. Worm Gear
4. Slip Clutch Drive Gear
5. Slip Clutch Idler Gear
6. Slip Clutch Spur Gear
7. Slip Clutch Band Dog
8. Slip Clutch Band
9. Slip Clutch Drum
10. Counter Drum Drive Gear
11. Counter Drum Idler Gear
12. Counter Drum Spur Gear
13. Planetary Drive Gear
14. Planetary Stationary Gear
15. Counter Drum Planetary Gear
16. Cam Drive Gear Assembly
17. Cam Drum Idler Gear
18. Cam Drum Spur Gear
19. Cam Drum Ratchet Dog
20. Cam Drum Ratchet Tooth
21. Cam Drum
22. Counter Drum Slot Ring
23. Counter Drum Slot Ring Pawl
    (23A—Pawl Heel)
    (23B—Pawl Tail)
    (23C—Pawl Toe)
24. Counter Drum Home Stop Gear
25. Home Stop Pawl Operating Gear
26. Pawl Lifting Lever
27. Pawl Lifting Toggle
28. Home Stop Ring
29. Home Stop Pawl
    (29A—Pawl Heel)
    (29B—Pawl Tail)
    (29C—Pawl Toe)
30. Stop Ring
31. Stop Ring Pawl
    (31A—Pawl Heel)
    (31B—Pawl Tail)
    (31C—Pawl Toe)
32. Pawl Spring
33. Stop Ring Drum Lock
34. Tuning Knob Shaft
35. Tuning Drive Gear
36. Tuning Drive Limit Spline
37. Tuning Idler Gear
38. Tuning Spur Gear
39. Tuning Spur Gear Clutch
40. Tuned Element
41. Stop Bar
42. Stop Ring Drum Drive
43. Cam Drum Drive Gear
44. Autotune Motor Control Switch Lock
45. Locking Arm Drive Gear
46. Locking Arm Spur Gear
47. Locking Arm Engage Collar
48. Locking Arm Operating Clutch Drum
49. Locking Arm Operating Clutch Cam
50. Locking Arm Operating Clutch Arm
51. Locking Arm Operating Clutch Arm Spring
52. Locking Arm
53. Autotune Motor Control Switch (S-109)
54. Faulty Operation Switch (S-108)
55. Faulty Operation Switch Cam
56. Faulty Operation Switch Interlock Arm
57. Faulty Operation Switch Interlock Clutch Cam
58. Seeking Switch (S-106)
59. Seeking Switch Adjustment
60. Seeking Switch Ratchet Dog
61. Seeking Switch Ratchet Tooth
62. Breaker Contacts (S-107)
63. Breaker Cam
64. Autotune Starting Relay
65. Autotune Starting Relay Contacts
66. Locking Arm Operating Clutch Spring
67. Single Tooth Ratchet Assembly
68. Seeking Switch Locking Collar
69. Neon Bulb (surge absorber)
70. Indicator Arm
71. Home Stop Anchor
72. Home Stop Pawl Push Rod
73. Home Stop Anchor Spring
74. Pawl Lifting Shaft
75. Actuator Lever
76. Toggle Spring

Figure 4-1. Autotune Control Unit Functional Diagram

TACTS (65).—When the seeking switch has come to rest in the position that corresponds to the channel that has been selected the Autotune motor control switch is closed. The closing of the switch reverses the Autotune motor to complete the last half of the cycle. When the last half of the Autotune cycle is completed, the Autotune control switch is returned to the original position and the motor is stopped. With the switch in this position the Autotune motor is connected for forward rotation. The motor will operate when the next channel is selected and the energizing circuit of the motor is completed by the closing of the Autotune starting relay switch contacts.

Functional Sequence Number	Identi-fying Number	FUNCTIONAL DESCRIPTION OF PART	Operates on Number
1	(1)	Line Shaft	(2)
2	(2)	Drive Worm	(3)
3	(3)	Worm Gear	(45)
4	(45)	Locking Arm Drive Gear	(46)
5	(46)	Locking Arm Spur Gear	(49)
6	(49)	Locking Arm Operating Clutch Cam	(50)
7	(50)	Locking Arm Operating Clutch Arm	(52-53)
8	(53)	Autotune Motor Control Switch	
9	(52)	Locking Arm	(44)
10	(44)	Autotune Motor Control Switch Lock	(65)
11	(65)	Autotune Starting Relay Contacts	

(c) FAULTY OPERATION SWITCH (54).—If the selector switch fails to find an open circuit within two revolutions, the faulty operation switch will close and energize the releasing coil of the ON-OFF switch. The energizing of the releasing coil will cause the switch to rotate to the OFF position to disable the equipment.

Functional Sequence Number	Identi-fying Number	FUNCTIONAL DESCRIPTION OF PART	Operates on Number
1	(1)	Line Shaft	(2)
2	(2)	Drive Worm	(3)
3	(3)	Worm Gear	(45)
4	(45)	Locking Arm Drive Gear	(46)
5	(46)	Locking Arm Spur Gear	(55)
6	(55)	Faulty Operation Switch Cam	(54)
7	(54)	Faulty Operation Switch	

(3) AUTOTUNE SINGLETURN UNIT. *(See figures 4-2, 6-26, 6-27 and 6-28.)* — The singleturn unit derives its name from the fact that it will mechanically position a tuning element that does not require more than 360 degrees of rotation. The unit includes a friction band type clutch for transmitting the driving torque to the positioning elements, a stop ring drum assembly, a pawl stack, a cam drum and the associated driving gears.

(a) CAM DRUM DRIVE (21). — The cam drum has ten slots, one for each of the ten channels, spaced 36° apart. Selecting any channel will result in the pawl corresponding to the channel dialed coming to rest in the proper slot. The rotation of the cam drum is in a counterclockwise direction only, due to the ratchet drive. The cam drum does not rotate during the last half of the Autotune cycle.

Functional Sequence Number	Identi-fying Number	FUNCTIONAL DESCRIPTION OF PART	Operates on Number
1	(1)	Line Shaft	(2)
2	(2)	Drive Worm	(3)
3	(3)	Worm Gear	(43,9,40)
4	(43)	Cam Drum Drive Gear	(16)
5	(16)	Cam Drum Idler Gear	(18)
6	(18)	Cam Drum Spur Gear	(19)
7	(19)	Cam Drum Ratchet Dog	(20)
8	(20)	Cam Drum Ratchet Tooth	(21)
9	(21)	Cam Drum	(31A)
	(31A)	Stop Ring Pawl Heel	

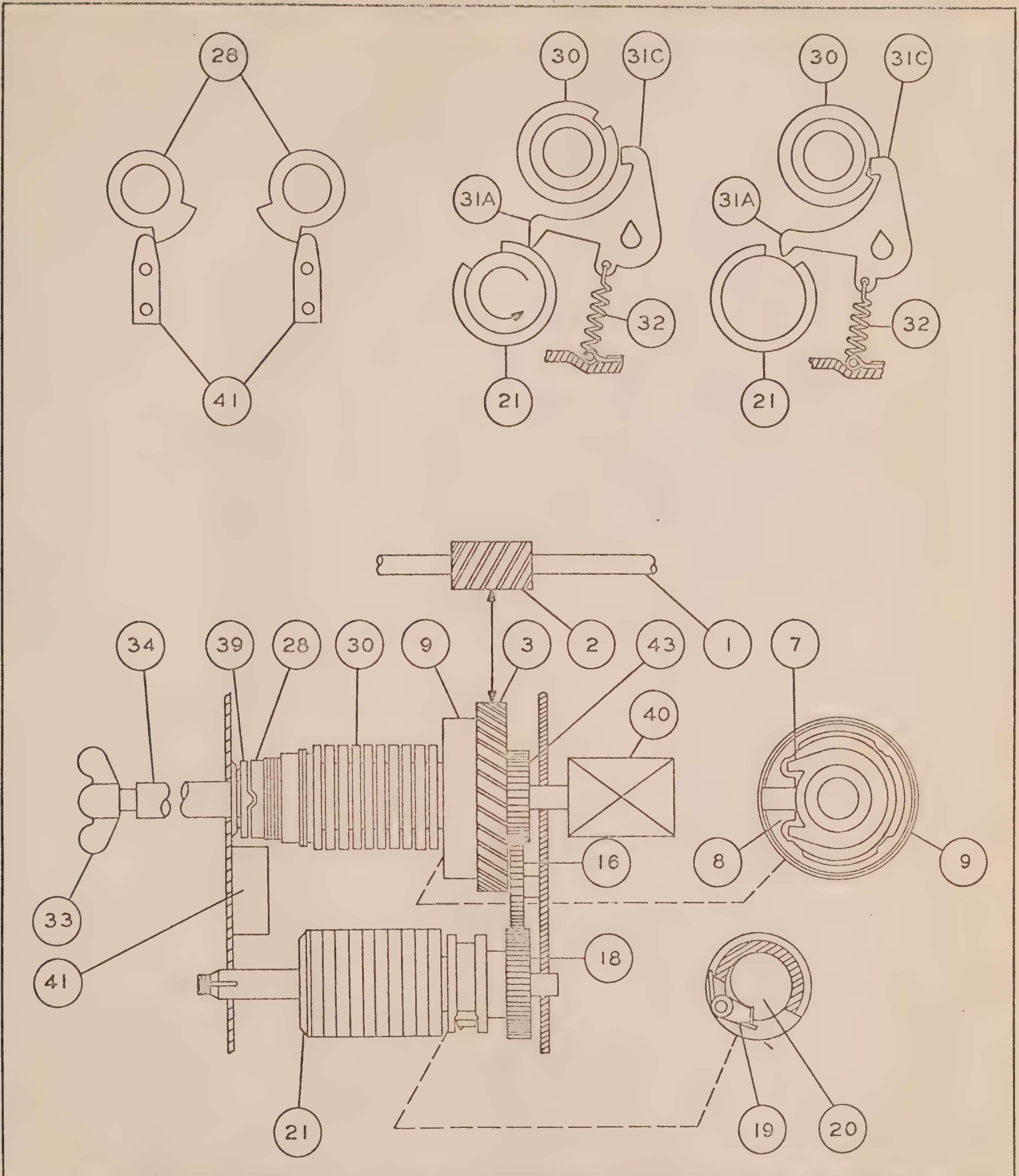
(b) STOP RING DRIVE (30). — There are ten stop rings on the stop ring stack, one for each of the ten channels. Keyed washers between stop rings permit each stop ring to rotate independently of all others when the stack is unlocked. Setting the tuned element and locking the stop ring stack at that setting will result in the tuned element returning to this same position when that channel is again selected. The stack of stop rings rotates both counterclockwise and clockwise until stopped by a stop ring pawl.

Functional Sequence Number	Identi-fying Number	FUNCTIONAL DESCRIPTION OF PART	Operates on Number
1	(1)	Line Shaft	(2)
2	(2)	Drive Worm	(3)
3	(3)	Worm Gear	(43,9,40)
4	(9)	Slip Clutch Drum	(8)
5	(8)	Slip Clutch Band	(7)
6	(7)	Slip Clutch Band Dog	(28, 30)
7	(28)	Home Stop Ring	(41)
	(41)	Stop Bar	
	(30)	Stop Ring	(31C)
	(31C)	Stop Ring Pawl Toe	

(c) STOP RING PAWL (31). — When the stop rings are unlocked the stop ring pawl toes dropping into the stop ring slots hold the stop ring fixed while the tuned element is rotated for initial adjustment. When the tuned element has been set and the stop rings locked, the pawl toes, serve to stop the tuned element at the pre-set point. The pawl heels fall into the cam drum slots allowing the pawl spring to force the pawl toe into the stop ring slots.

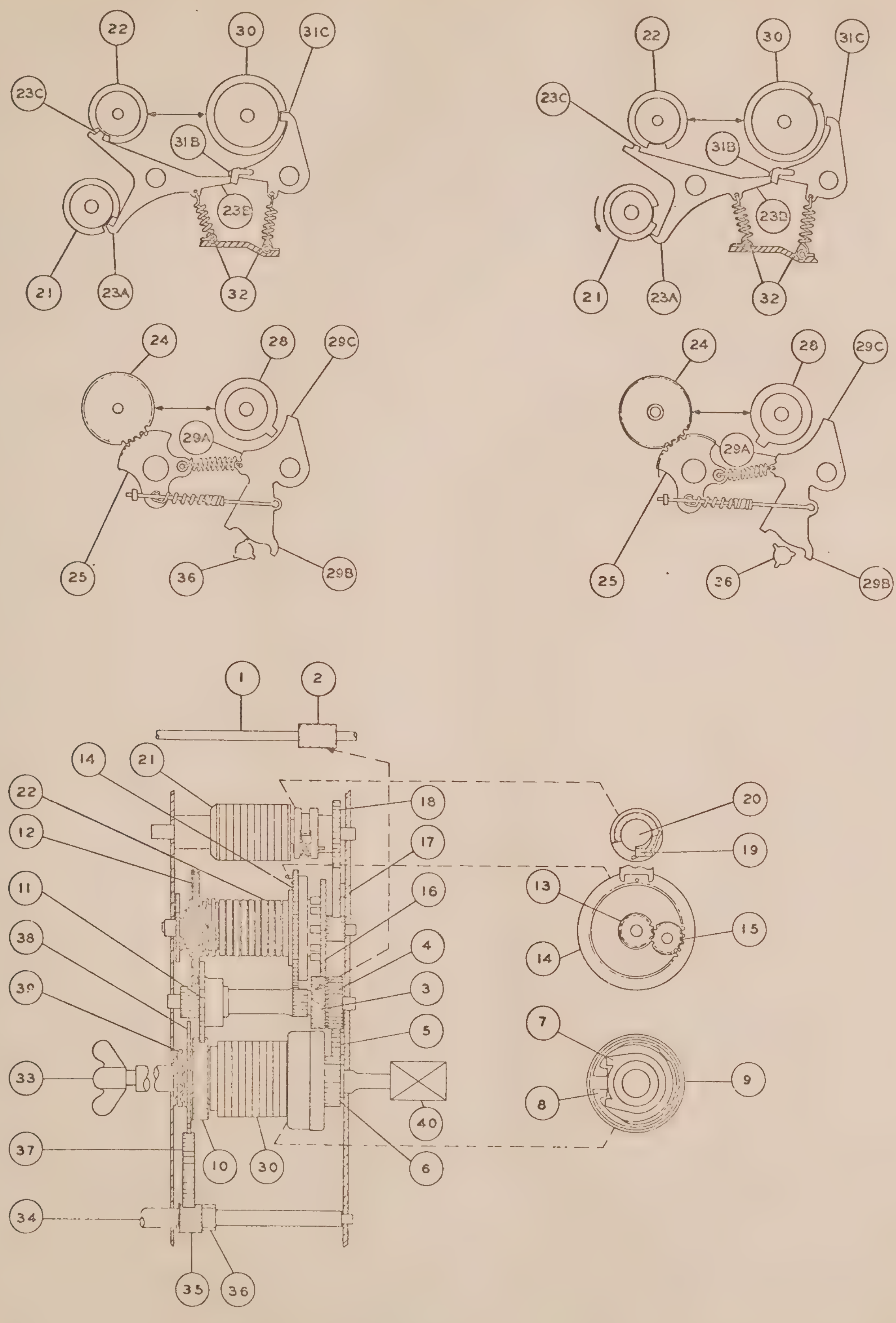
Functional Sequence Number	Identi-fying Number	FUNCTIONAL DESCRIPTION OF PART	Operates on Number
	(31)	Stop Ring Pawl	(30)
	(30)	Stop Ring	
	(40)	Tuning Element	

(4) AUTOTUNE MULTITURN UNIT. *(See figures 4-3, 4-3A, 6-29, 6-30 and 6-31.)* — The multiturn unit mechanically positions a tuning element requiring more than 360 degrees of rotation. In this equipment, the multiturn unit may be required to complete as many as ten revolutions to position the tuning element. The unit includes a friction band type clutch for transmitting the driving torque to



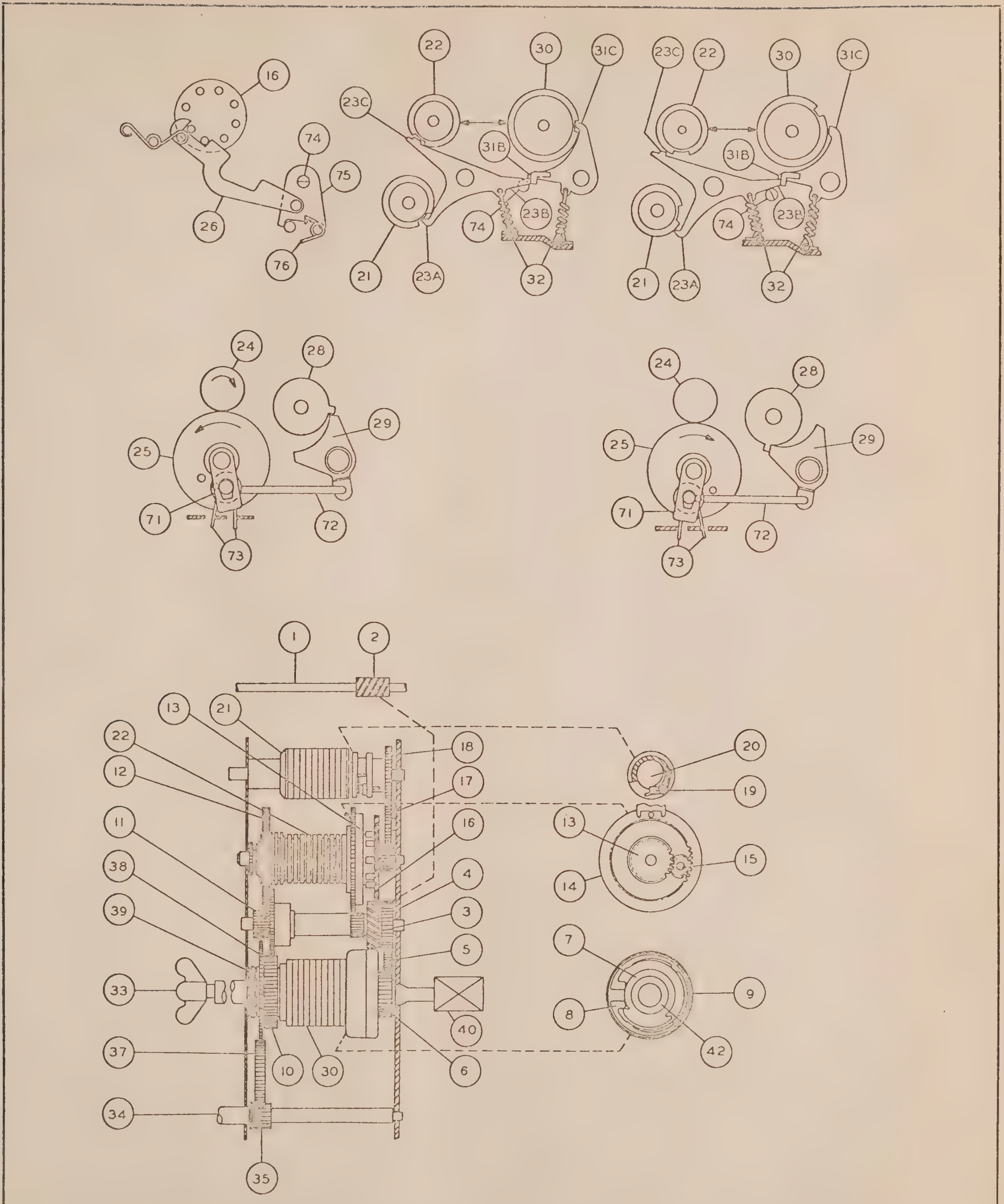
Note—Key to symbols may be found in Figure 4-1.

Figure 4-2. Singleturn Unit Functional Diagram



Note—Key to symbols may be found in Figure 4-1.

Figure 4-3. Multiturn Unit Functional Diagram, AN/ARR-15



Note—Key to symbols may be found in Figure 4-1.

Figure 4-3A. Multiturn Functional Diagram, AN/ARR-15A

the positioning elements, a stop ring drum assembly, a pawl stack, a pawl lifting device, a counter drum assembly, a cam drum and the associated driving gears.

(*a*) CAM DRUM DRIVE (21). — The cam drum has ten slots, one for each of the ten channels, spaced 36 degrees apart. Dialing any channel will result in the pawl corresponding to the channel dialed coming to rest in the proper slot. The rotation of the cam drum is in a clockwise direction only, due to the ratchet drive. The cam drum does not rotate during the last half of the Autotune cycle.

Functional Sequence Number	Identi-fying Number	FUNCTIONAL DESCRIPTION OF PART	Operates on Number
1	(1)	Line Shaft	(2)
2	(2)	Drive Worm	(3)
3	(3)	Worm Gear	(16)
4	(16)	Cam Drive Gear Assembly	(17)
5	(17)	Cam Drum Idler Gear	(18)
6	(18)	Cam Drum Spur Gear	(19)
7	(19)	Cam Drum Ratchet Dog	(20)
8	(20)	Cam Drum Ratchet Tooth	(21)
9	(21)	Cam Drum	

(*b*) STOP RING DRIVE (30).—There are ten stop rings in the stop ring stack, one for each of the ten channels. When the Autotune unit is unlocked each stop ring is free to rotate independently of the others due to the presence of keyed washers between adjacent rings. Setting the tuned element and locking the stop ring stack at that setting will result in the tuned element taking this same position when that channel is again selected. All stop rings rotate both counterclockwise and clockwise until stopped by a stop ring pawl.

Functional Sequence Number	Identi-fying Number	FUNCTIONAL DESCRIPTION OF PART	Operates on Number
1	(1)	Line Shaft	(2)
2	(2)	Drive Worm	(3)
3	(3)	Worm Gear	(4, 16)
4	(4)	Slip Clutch Drive Gear	(5)
5	(5)	Slip Clutch Idler Gear	(6)
6	(6)	Slip Clutch Spur Gear	(7, 40)
7	(7)	Slip Clutch Band Dog	(8)
8	(8)	Slip Clutch Band	(9)
9	(9)	Slip Clutch Drum	(30)
10	(30)	Stop Rings	(10)
	(10)	Counter Drum Drive Gear	

(*c*) COUNTER DRUM DRIVE (FAST). — The counter drum serves to select the revolution in which the stop ring is to be engaged by the stop ring pawl toe. Ten counter drum slot rings, one for each Autotune channel, are mounted on the counter drum shaft and separated by spacers that are keyed to the shaft. A wavy washer that is mounted on the shaft loads the stack of slot rings axially so that the rings cannot easily be turned independently of the counter drum shaft. The position of any given counter drum slot ring is adjusted during the adjustment of the tuned element. At the instant the planetary drive gear changes direction of rotation, the planteary stationary gear is allowed to move the width of the planetary stationary gear pin slot. The counter drum is then driven by the counter drum spur gear. The gear ratio between this gear and the counter drum drive gear causes the counter drum to rotate more rapidly. The planetary stationary gear then reaches the end of its travel, the counter drum resumes its normal speed of rotation, and the counter drum spur gear slips upon the counter drum shaft. The result is that at the limits of the counter drum rotation, the counter drum rotates more rapidly.

Functional Sequence Number	Identi-fying Number	FUNCTIONAL DESCRIPTION OF PART	Operates on Number
1	(10)	Counter Drum Drive Gear	(11)
2	(11)	Counter Drum Idler Gear	(12)
3	(12)	Counter Drum Spur Gear	(22)
4	(22)	Counter Drum Slot Rings	

(*d*) COUNTER DRUM DRIVE (SLOW). — When the planetary stationary gear has traveled the width of the gear pin slot and ceases to turn, the counter drum planetary gear is driven by the planetary drive gear. Since the shaft for the gear is fastened to the counter drum assembly, the drum is driven at a slower speed as the gear travels around the driving gear.

Functional Sequence Number	Identi-fying Number	FUNCTIONAL DESCRIPTION OF PART	Operates on Number
1	(10)	Counter Drum Drive Gear	(11)
2	(11)	Counter Drum Idler Gear	(13)
3	(13)	Planetary Drive Gear	(22)
4	(22)	Counter Drum Slot Rings	

(*e*) OPERATING THE STOP RING PAWLS. — The stop ring pawl tail is released by the counter drum slot ring pawl tail. At the moment of release, the pawl is actuated by the pawl spring causing the pawl toe to press against the stop ring and to drop into the stop ring slot, within one revolution of the stop ring drum. The above sequence of events positions the tuned element.

Functional Sequence Number	Identi-fying Number	FUNCTIONAL DESCRIPTION OF PART	Operates on Number
1	(21)	Cam Drum	(23A)
2	(23A)	Counter Drum Slot Ring Pawl Heel	(23B)
3	(23B)	Counter Drum Slot Ring Pawl Tail	(31)
4	(31)	Stop Ring Pawl	(30)
5	(30)	Stop Rings	

(*f*) TIMING.—At the beginning of the Autotune cycle the cam drum rotates in a clockwise direction. The cam drum is driven by the cam drum idler gear and the cam drive gear assembly. The pins on the cam drive gear assembly force the pawl lifting lever upward and toward the left. In the AN/ARR-15, this action expands the pawl lifting toggle. The pawl lifting toggle, when expanded, prevents the pawls from dropping into the counter drum ring slots. When the direction of rotation is reversed, the pawl lifting lever is forced down and

to the right, collapsing the pawl lifting toggle and allowing the counter drum slot ring pawl toes to drop into the counter drum slot ring slots. In the AN/ARR-15A, the action of the pawl lifting lever rotates the pawl lifting shaft, preventing the pawls from engaging the counter drum ring slots. Reversing the direction of rotation forces the pawl lifting lever down and to the right, rotating the pawl lifting shaft and allowing the pawls to engage slots in the counter drum stop ring. Because the cam drum is driven by a single tooth ratchet, the drum cannot be rotated in a counterclockwise direction. When the counter drum slot ring pawl toe drops into place, the counter drum slot ring pawl rides on the counter drum ring and drops into the slot. The operation of the counter drum slot ring pawl toe, operates counter drum slot ring pawl tail. The counter drum slot ring pawl tail operates the stop ring pawl tail and permits the stop ring pawl toe to engage the stop ring slot.

Functional Sequence Number	Identifying Number	FUNCTIONAL DESCRIPTION OF PART	Operates on Number
1	(22)	Counter Drum Slot Rings	(23C)
2	(23C)	Counter Drum Slot Ring Pawl Toe	(23B)
3	(23B)	Counter Drum Slot Ring Pawl Tail	(31)
4	(31)	Stop Ring Pawl	(30)
5	(30)	Stop Rings	(40)
6	(40)	Tuning Element	

(g) OPERATION OF THE PAWL LIFTING TOGGLE (AN/ARR-15A).—The pawl lifting toggle is located directly below the tails of the counter drum pawls. The toggle base is rigidly attached to the control unit frame. The upper part of the toggle, which lifts the pawl tails, pivots on an arm fastened to the counter drum pawl shaft. The center hinged sections of the pawl lifting toggle is operated by pins on the cam drive gear assembly through the pawl lifting lever. When the counter drum is rotated in a clockwise direction, the pawl lifting lever moves in the direction which collapses the toggle allowing the counter drum pawls to fall into the counter drum ring slots. When the counter drum is rotated in a counterclockwise direction the pawl lifting lever moves in the opposite direction which straightens the toggle under the counter drum pawls preventing the pawls from dropping into the counter drum ring slots.

Functional Sequence Number	Identifying Number	FUNCTIONAL DESCRIPTION OF PART	Operates on Number
1	(17)	Cam Drive Gear Assembly	(26)
2	(26)	Pawl Lifting Lever	(27)
3	(27)	Pawl Lifting Toggle	(23B)
4	(23B)	Counter Drum Slot Ring Pawl Tails	(23C)
5	(23C)	Counter Drum Slot Ring Pawl Toes	(22)
6	(22)	Counter Drum Slot Rings	

(g1) OPERATION OF THE PAWL LIFTING MECHANISM (AN/ARR-15A).—*(See figure 4-3A.)* The pawl lifting mechanism consists of the pawl lifting shaft and the actuator lever. The shaft has a flat that is positioned under the counter drum slot ring pawl tails. The pawl lifting lever is attached to the actuator lever. When the counter drum is rotated in a clockwise direction, pins on the cam drive gear assembly move the pawl lifting lever which rotates the actuator lever and the pawl lifting shaft. This action raises the pawl tails and prevents the pawl toes from dropping into slots in the counter drum slot rings. When the counter drum is rotated in the opposite direction, the pawl lifting lever rotates the actuator lever and the pawl lifting shaft until the flat is beneath the counter drum slot ring pawl tails. This frees the counter drum slot ring pawl tails so that the counter drum slot ring pawl toes may fall into the slots in the counter drum slot rings. A toggle spring assures that the actuator lever will stop only in the two extreme positions.

Functional Sequence Number	Identifying Number	FUNCTIONAL DESCRIPTION OF PART	Operates on Number
1	(16)	Cam Drive Gear Assembly	(26)
2	(26)	Pawl Lifting Lever	(75)
3	(75)	Actuator Lever	(74)
4	(74)	Pawl Lifting Shaft	(23B)
5	(23B)	Counter Drum Slot Ring Pawl Tails	(23C)
6	(23C)	Counter Drum Slot Ring Pawl Toes	(22)
7	(22)	Counter Drum Slot Rings	

(h) STOP RING DRUM LIMIT DRIVE (AN/ARR-15).—The counter drum home stop gear is driven by a limiting ratchet within the counter drum. When the counter drum has rotated in a clockwise direction to the predetermined limit, the ratchet drives the counter drum home stop gear in a clockwise direction. The counter drum home stop gear operates the home stop pawl operating gear which in turn operates the home stop pawl. This pawl limits the counterclockwise rotation of the home stop ring. Conversely, rotation of the counter drum home stop gear in the counterclockwise direction limits the rotation of the home stop ring in a clockwise direction.

Functional Sequence Number	Identifying Number	FUNCTIONAL DESCRIPTION OF PART	Operates on Number
1	(13)	Planetary Drive Gear	(24, 15)
2	(24)	Counter Drum Home Stop Drive Gear	(25)
3	(25)	Home Stop Operating Gear	(29)
4	(29)	Home Stop Pawl	(28)
5	(28)	Home Stop Ring	

(h1) STOP RING DRUM LIMIT DRIVE (AN/ARR-15A). — The counter drum home stop drive gear is affixed to a shaft extending through the counter drum. The shaft is driven by the planetary drive gear. The counter drum home stop drive gear drives the home stop pawl operating gear which, at

the limits of its rotation, moves the home stop anchor, causing the home stop pawl push rod to operate the home stop pawl. The home stop pawl engages a tooth on the home stop ring, stopping the rotation of the stop ring drum. When the stop ring drum revolves in a clockwise direction, the home stop ring tooth engages the home stop pawl toe to limit its rotation. Approaching the rotation limit with counterclockwise rotation, the home stop ring tooth contacts the home stop pawl heel.

Functional Sequence Number	Identifying Number	FUNCTIONAL DESCRIPTION OF PART	Operates on Number
1	(13)	Planetary Drive Gear	(24, 15)
2	(24)	Counter Drum Home Stop Gear	(25)
3	(25)	Home Stop Pawl Operating Gear	(71)
4	(71)	Home Stop Anchor	(72)
5	(72)	Home Stop Pawl Push Rod	(29)
6	(29)	Home Stop Pawl	(28)
7	(28)	Home Stop Ring	

(i) TUNING DRIVE. — Half of the tuning spur gear clutch is rigidly attached to the tuning spur gear. When this clutch is not engaged, the tuning gear is independent of the Autotune system and does not rotate with it. When the lock is loosened, the clutch is engaged and the tuning spur gear is coupled to the stop ring drum shaft. In the AN/ARR-15, the tuning drive gear spline limits the rotation of the tuning drive gear by engaging the stop ring drum home stop pawl tail. In the AN/ARR-15A, the rotation of the tuning drive gear is limited by the home stop ring on the stop ring drum shaft, as described in the preceding paragraph.

Functional Sequence Number	Identifying Number	FUNCTIONAL DESCRIPTION OF PART	Operates on Number
1	(34)	Tuning Knob	(35)
2	(35)	Tuning Drive Gear	(37, 36)
3	(37)	Tuning Idler Gear	(38)
4	(38)	Tuning Spur Gear	(39)
5	(39)	Tuning Spur Gear Clutch	(40)
6	(40)	Tuning Element	
	(36)	Tuning Drive Gear Spline	

2. ELECTRICAL CHARACTERISTICS.

a. AUTOTUNE ELECTRICAL DETAILS. *(See figure 4-4.)*

B-101, MOTOR.—The Autotune motor operates from the 26.5 volt d-c power source and is controlled by the motor starting relay, K-103, and the motor control switch, S-109. The components employed in the Autotune control circuit and the functions of each are given below:

K-103, MOTOR STARTING RELAY. — The motor starting relay is energized by the circuit through the contacts of the primary power control relay, the contacts of the circuit seeking and timing switches, the contacts of the channel selector switch and the contacts of the ON-OFF switch to ground.

S-109, MOTOR CONTROL SWITCH. — The motor control switch is operated mechanically by the rotation of the motor. Indirectly, the motor control switch is controlled electrically by the motor starting relay. A locking arrangement on the motor starting relay allows the control switch to be operated mechanically only, at specific times.

S-105, — S-1002, CHANNEL SELECTOR SWITCH. — At either the receiver location or the remote control position, if the ON-OFF switch is in the ON position, the operation of the CHANNEL selector switch will operate the motor starting relay by completing the circuit through the coil of the relay to ground. The operation of the motor starting relay energizes the motor and begins the Autotune cycle. Any one of ten different frequency channels may be selected by the operation of this switch.

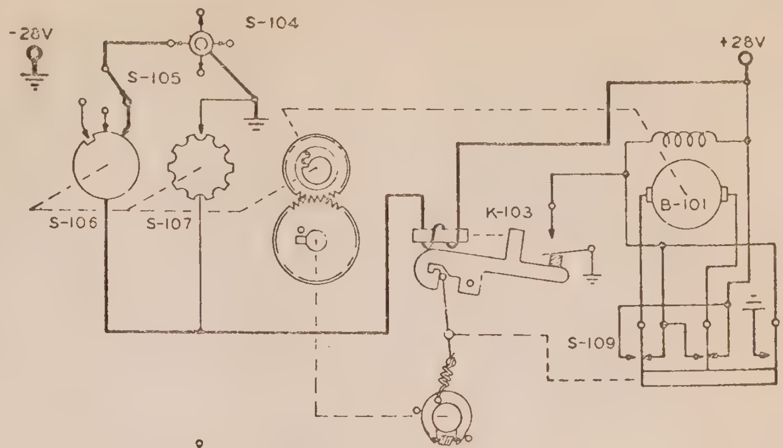
S-106, CIRCUIT SEEKING SWITCH. — The circuit seeking switch is a part of the Autotune control unit and is driven by the motor. For an instant during each of the ten switch positions, the circuit seeking switch is disconnected from ground by the breaker contacts of the timing switch, S-107. The breaker contact cam is attached to the same shaft as the circuit seeking switch rotating element. The operation of the motor start relay, mechanically locks a motor ground completing circuit into place and prevents the seeking switch and the breaker contacts from finding and opening the circuit that is selected by the channel selector switch until after the rotation of the motor unlocks the motor start relay.

S-107, TIMING SWITCH. — The contacts are momentarily opened ten times as the circuit seeking switch rotates thru 360 degrees. The timing switch contacts are opened by the operation of a cam that is attached to the same shaft as the rotor of the circuit seeking switch. After the rotation of the motor unlocks the motor start relay and substitutes the seeking switch circuit for the motor ground completing circuit through the contact on the start relay, the timing switch contacts and the circuit seeking switch find the open ground circuit within one revolution. During this interval the open segment of the circuit seeking switch has found the circuit that was selected and the timing switch contacts open. The opening of the timing switch contacts breaks the energizing circuit of the motor start relay. The motor start relay returns to the normal (unoperated) position, allowing the motor control switch to be mechanically positioned for the reversing of the motor. When the motor has reversed the required distance, the motor control switch is mechanically operated to the original position, removing the motor energizing circuit and stopping the motor.

S-108, FAULTY OPERATION SWITCH.—This switch is operated if the motor fails to reverse as a result of the faulty operation of the channel selector switch, the circuit seeking switch or the timer switch breaker contacts of the motor control switch.

STEP #1

a. A frequency channel has been selected by manually operating the CHANNEL selector switch, S-105.



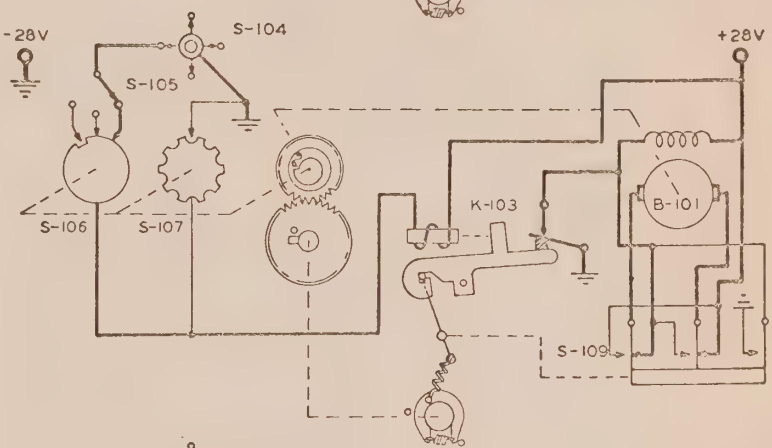
STEP #2

a. Relay K103 has operated as the result of the completing of the energizing circuit through switch S-105.

b. The contacts of relay K103 have closed to complete the Autotune motor energizing circuit.

c. The armature of the motor has not begun to rotate.

d. The relay locking arm has dropped into the locking position.

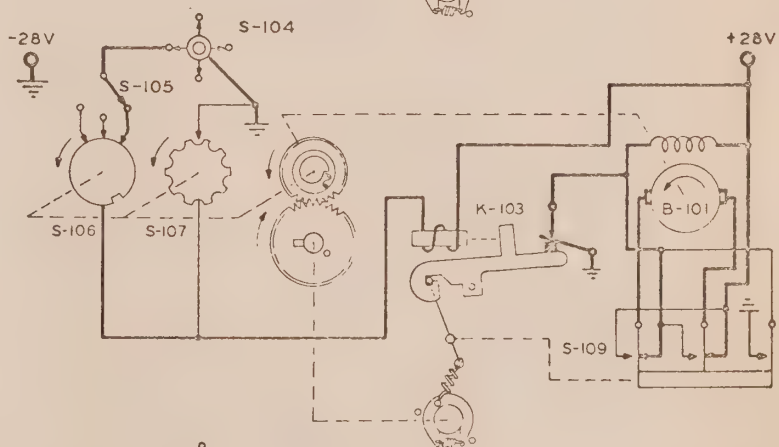


STEP #3

a. The armature of the motor has rotated counterclockwise.

b. Seeking switch S106 and breaker cam (S107) have rotated one-half of a revolution in a counterclockwise direction.

c. Relay K103 is still operated.



STEP #4

a. The motor armature is still rotating in a counterclockwise direction.

b. The seeking switch, S106, and the breaker cam (S107) have continued to rotate counterclockwise and have reached the position that breaks the energizing circuit of relay K103.

c. Relay K103 is held closed by the relay locking arm.

d. The pin on the drive gear approaches the pin on the clutch which drives the actuating arm of both S109 and the K103 locking arm.

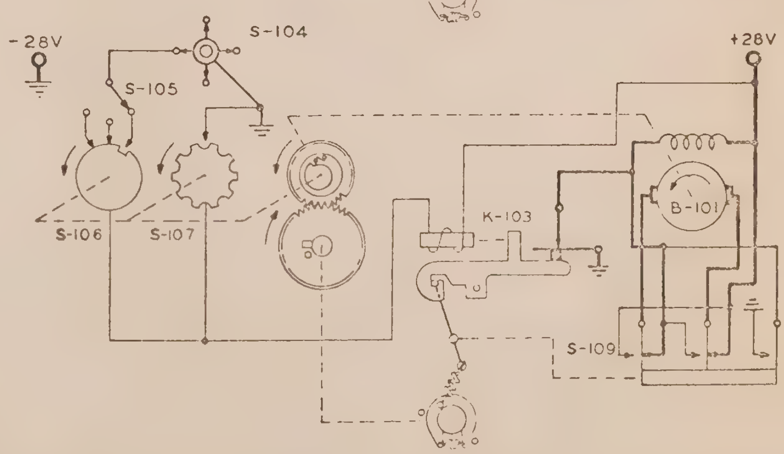


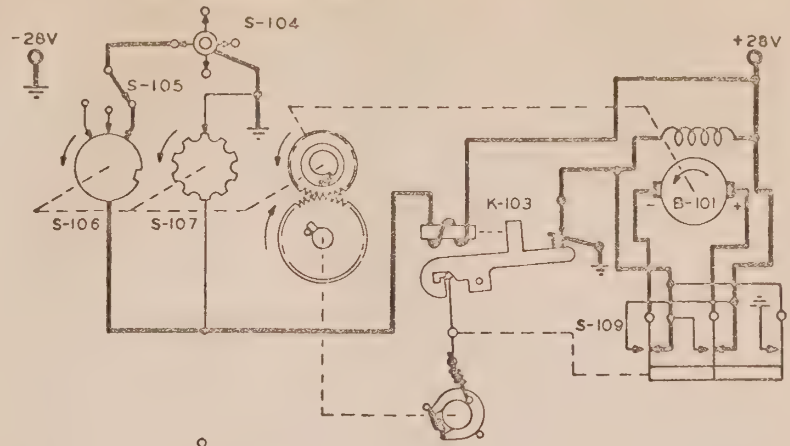
Figure 4-4. Autotune Sequence of Operation (Sheet 1 of 2 Sheets)

STEP #5

a. The motor armature is still rotating in a counterclockwise direction.

b. Seeking switch, S106, and the breaker cam (S107) have continued to rotate counterclockwise and have reached the position that closes the energizing circuit of relay K103.

c. The clutch has continued to operate and has compressed the spring which drives the actuating arm of S109 and the K103 locking arm. The locking arm has unlocked K103.



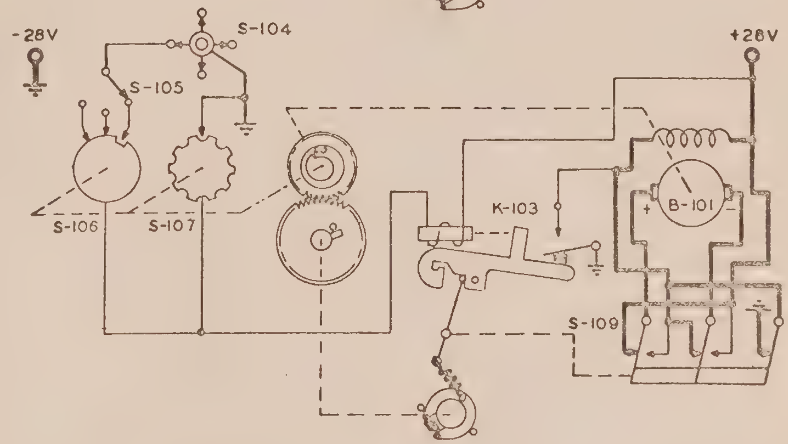
STEP #6

a. Seeking switch, S106, and the breaker cam, S107, have reached the position that breaks the energizing circuit of K103.

b. Relay K103 opens and causes the motor armature to cease counterclockwise rotation.

c. The compressed spring on the locking arm operating clutch operates the motor reversing switch S109, to the reverse position.

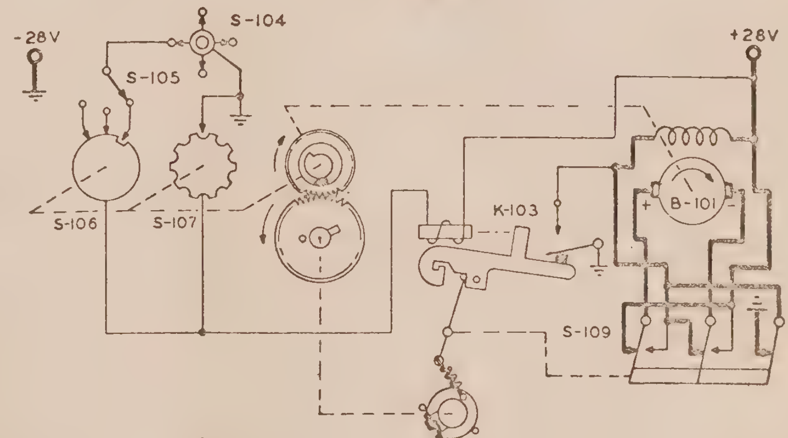
d. The motor armature begins to rotate in a clockwise direction.



STEP #7

a. The motor armature is still operating in a clockwise direction.

b. Reversing switch S109 is still held in place by locking arm operating clutch arm spring.



STEP #8

a. The pin on the drive gear engages the pin on the clutch, which drives the actuating arm of both S109 and the K103 locking arm, and restores S109 to the original position.

b. The motor is de-energized and completes clockwise rotation.

c. The Autotune cycle is completed and the system is ready for the selecting of a new frequency channel.

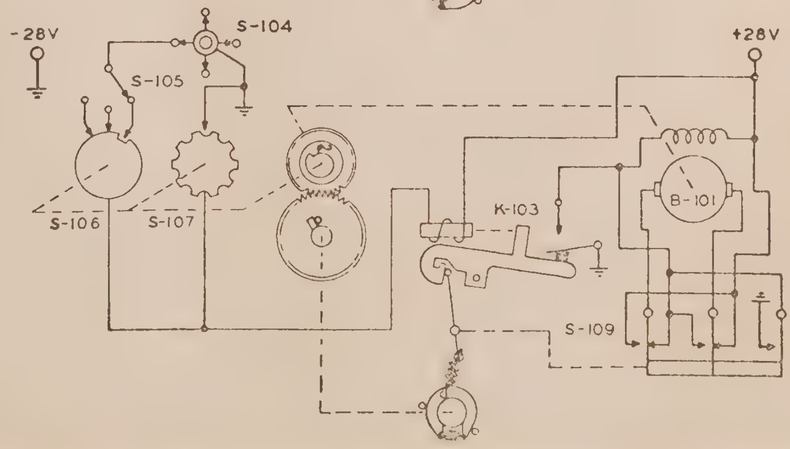


Figure 4-4. Autotune Sequence of Operation (Sheet 2 of 2 Sheets)

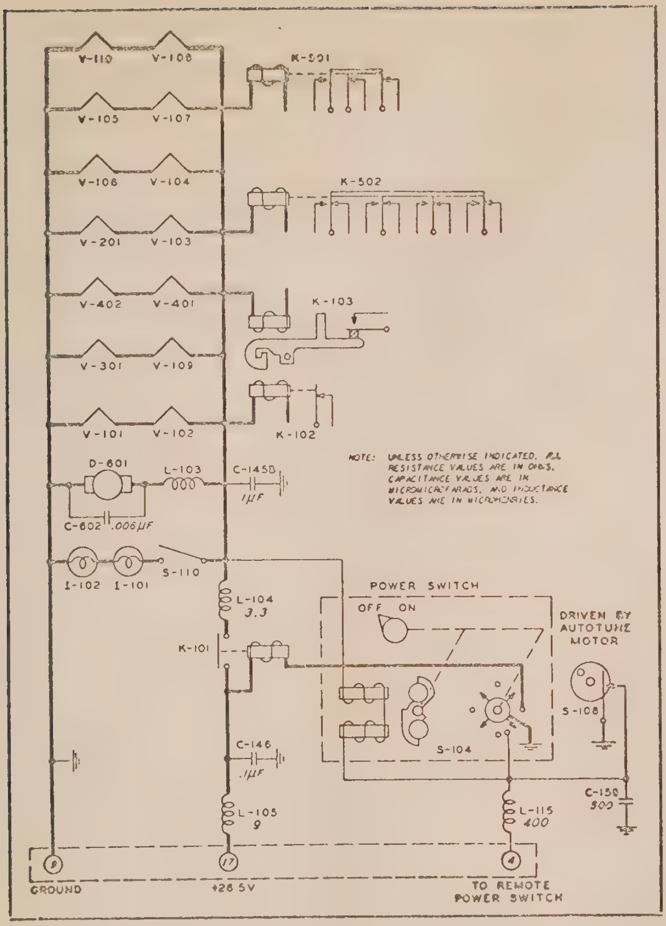


Figure 4-5. Primary Power Circuits

The operation of this switch energizes the coil of the ON-OFF switch and causes the ON-OFF switch to be rotated to the OFF position, disabling the entire equipment.

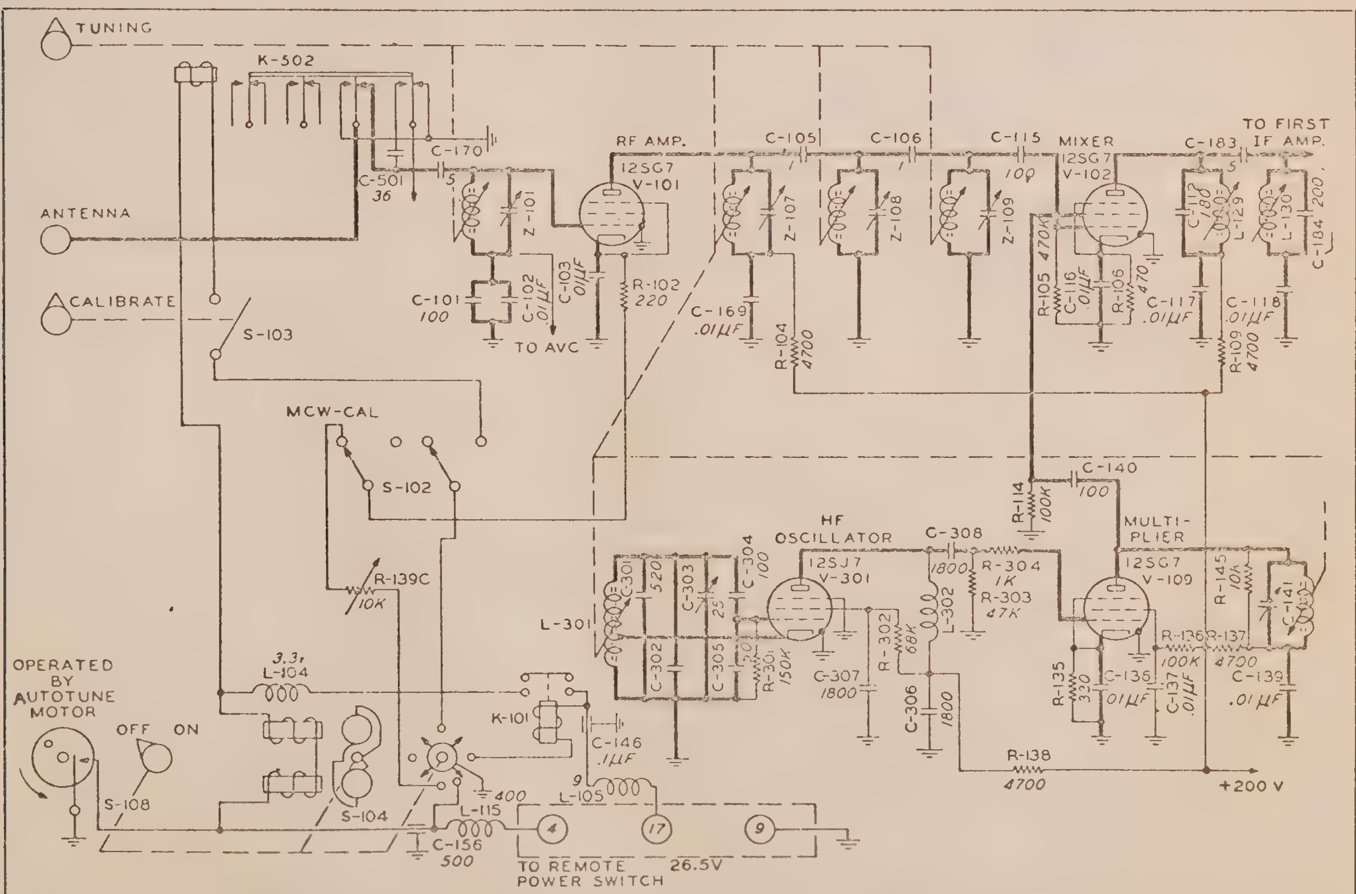
b. SEQUENCE OF OPERATION.—The sequence of operation is explained fully in figure 4-4.

c. PRIMARY POWER CIRCUITS. *(See figure 4-5.)*—This equipment has been designed to operate from a 26.5 volt d-c power source. All of the vacuum tubes that are used in the equipment are of the 12.6 volt heater type. The heaters of the tubes are connected in series-parallel across the power source. The resistance of the filter chokes and leads to the tube heaters reduce the voltage to the correct value for application to the series-parallel connected heaters.

Refer to figure 4-5. With the connections from the power source made to terminals 9, and 17 of connector plug P-101 (terminals 9 negative and terminals 17 positive), complete control of application of voltage to the equipment is held by the ON-OFF switch. The operating of the ON-OFF switch, either the panel switch or a remote switch, to the ON position energizes the primary power control relay, K-101. The operation of the primary power control relay applies voltage to all vacuum tube heaters, to the two dial lamps and to the motor section of the dynamotor and connects one side of all of the relay coils to the positive side of the power source. The ON-OFF switch may be released either manually or electrically. Identical power control switches are used on the equipment control panel and on the remote control units. The switch contains a solenoid and when the solenoid is energized, the switch is released. The grounding end of the solenoid that is located in the equipment control panel ON-OFF switch is brought out to terminal 4 on connector plug P-101. When the ON-OFF switch is in the ON position, the grounding of the terminal 4 will release the switch and a spring will return the mechanism to the OFF position. All ON-OFF switches that are used with any one installation are connected in parallel and the operating of any one switch to the ON position will energize the solenoid of the ON-OFF switch that is in the ON position.

The following table lists the reference symbols and functions of the control relays:

Reference Symbols	Functions
K-101 PRIMARY CONTROL RELAY	(Operated by ON-OFF switch) When the ON-OFF switch is rotated to the ON position, the primary power control relay K-101 energizes the dynamotor.
K-102 RECEIVER DISABLING RELAY	When the Autotune motor is operating the contacts of the relay K-102 are opened removing the ground circuit from terminal 4 of T-101.
K-103 AUTOTUNE STARTING RELAY	Selecting a channel with switch S-105 operates relay K-103 starting Autotune motor by grounding one side of the field to complete the circuit.
K-501 MCW-CW, CAL RELAY	MCW—In the MCW position the cw-avc is grounded and plate voltage is removed from the bfo.
	CW, CAL—In the CW-CAL position the cw-avc is operative and plate voltage is applied to the bfo.
K-502 CAL – RECEIVE	CAL—When the relay is in the CAL position, plate voltage is applied to the cfi unit, cw ground is connected, ant circuit is grounded, and the cfi output voltage is connected to the receiver r-f input.
	RECEIVE—When the relay is in the receive position, plate voltage is removed from the cfi unit, and connected to r-f input, cfi output voltage is grounded.



NOTE: 1. Unless otherwise indicated, all resistance values are in ohms, capacitance values are in micromicrofarads, and induction values are in microhenries.

NOTE: 2. On receivers supplied under contracts NOa(s) 52-961 and 52-1027, C-105 and C-106 have value of 1.5 ohms.

Figure 4-6. R-F Circuits

d. RECEIVER CIRCUIT DESCRIPTION.

(1) GENERAL. (*See figure 1-2.*)—This receiving equipment covers a frequency range of one and one-half mc to 18.5 mc. The superheterodyne circuit employs one stage of tuned r-f amplification and two stages of i-f amplification. The normal operating frequency of the i-f stages is 500 kc but the i-f frequency may be varied 50 kc to either side of 500 kc, i.e., 450 to 550 kc, for calibration purposes. For calibration and excitation purposes three oscillators have been incorporated in this receiver. The frequency of one oscillator (cfi) is determined by a 100 kc quartz crystal. Harmonics of 100 kc are used when calibrating the receiver. During actual reception this oscillator circuit is disabled by removing the plate and screen voltages from the oscillator tube. The other two oscillators are variable frequency. One of the variable frequency oscillators is used in conjunction with a multiplier circuit to excite the mixer tube. This oscillator operates in a frequency range of 2000 to 3000 kc and the multiplier circuit is used to obtain the higher frequency excitation voltages. The remaining oscillator is essentially a beat frequency oscillator but is also used during the calibration of the receiver. The output of this oscillator is in the frequency range 450 to 550 kc. With the reception of voice modulated or mcw signals, the beat frequency oscillator circuit is disabled by removing the plate and screen voltages from the oscillator tube. Both of the variable frequency oscillators are precision built, mechanically and electrically, and give output which is exceptionally stable even under conditions of extreme humidity and temperature change. All three oscillators employ Type 12SJ7 tubes.

Detection is accomplished through the use of a type 1N34 fixed crystal rectifier unit (one-half of a 12SL7GT is used in the AN/ARR-15A). The output of the detector is coupled to the audio amplifier stages through a noise limiter consisting of a type 12SL7 dual triode and a type 12H6 dual diode. The audio amplifier consists of two tubes, a type 12SJ7, triode connected, in the driver stage and a type 12A6 beam tube, pentode connected, in the output stage. The delayed avc circuit employs a type 12SL7 dual triode tube.

(2) RECEIVER CIRCUIT FUNCTION.

(*a*) RF CIRCUITS. (*See figure 4-6.*)

1. GENERAL. — This receiver employs one stage of tuned r-f amplification. Separate excitation for the mixer is provided by an exciter consisting of the high frequency oscillator and multiplier. The oscillator operates in the frequency range of two mc to three mc. The frequency multiplier is used in conjunction with the oscillator to obtain excitation voltage of the frequency that is necessary for exciting the mixer at the particular frequency that is being received.

The r-f amplifier input and output circuits, the high frequency oscillator grid circuit and the multiplier plate circuit are tuned by varying the position of slugs within the inductors. All of these slugs are positioned by the TUNING control. The proper tuned circuits for the band of frequencies in which reception is desired are selected by the BAND switch.

The following table lists in order, the reference symbols, the circuit locations and the functions of the components in the r-f circuits as encountered when tracing the circuit from the antenna input to the mixer output:

Reference Symbols	Circuit Locations	Functions
K-502	Signal or calibrate input circuit	Calibrate-receive relay
C-170	V-101 grid circuit	Antenna coupler capacitor
Z-101	V-101 grid circuit	r-f amplifier grid tuned circuit
C-101, C-102	Series with Z-101 and gnd	r-f amplifier avc bypass
C-103	V-101 cathode circuit	r-f amplifier cathode bypass
C-105, C-106, C-115	V-101 plate, V-102 control grid	Band pass coupling capacitor
Z-107, Z-108, Z-109	V-101 plate, V-102 control grid	Band pass tuned circuits
C-169	Series with Z-107 and gnd	r-f amplifier plate bypass capacitor
C-183	Series with L-129 and L-130	Mixer-first i-f top coupling capacitor
C-112	Paralleled with L-129	Mixer plate tank capacitor
L-129	V-102 plate circuit	Mixer plate inductor
L-130	V-103 grid circuit	First i-f grid inductor
C-184	Paralleled with L-130	First i-f grid tank capacitor
C-117	V-102 plate circuit	Mixer plate bypass capacitor
C-118	V-103 grid circuit	First i-f avc bypass
L-301	V-301 grid circuit	hf osc grid inductor
C-301, C-302	V-301 grid circuit	hf osc trimmer capacitor
C-303	V-301 grid circuit	hf osc tuning capacitor
C-304	V-301 grid circuit	hf osc grid coupling capacitor
C-305	V-301 grid circuit	hf osc grid shunt capacitor
C-308	V-301 plate circuit	hf multiplier coupling capacitor
R-304	V-109 grid circuit	hf output equalizing resistor

Reference Symbols	Circuit Locations	Functions
C-136	V-109 cathode circuit	Multiplier cathode bypass capacitor
C-141	V-109 plate circuit	Multiplier tuning capacitor
L-101	V-109 plate circuit	Multiplier inductor
C-139	Series with L-109 and gnd	Multiplier plate bypass capacitor
C-140	V-109 plate circuit	hf osc mixer coupling capacitor

2. RF AMPLIFIER CIRCUITS.—The input and output circuits of the r-f amplifier tube, V-101, utilize parallel resonant circuits. These circuits are tuned by slugs in the inductors which are positioned by the TUNING control. The tuning capacitors in the parallel resonant circuits are adjusted so that these circuits track with the other tuned circuits in the receiver. A different set of coils and condensers is provided for each of the six receiver bands and are switched into the amplifier circuits by the BAND switch.

3. EXCITER CIRCUITS. — The exciter consists of the high frequency oscillator and the multiplier. The high frequency oscillator employs a Type 12SJ7 tube, V-301, in a variable frequency oscillator circuit operating within the frequency range of two mc to three mc. The frequency is varied by a tuning slug in the grid inductor, L-301, which is positioned by the TUNING control. The frequency of the high frequency oscillator is always the same for a given setting of the TUNING control regardless of the BAND switch setting.

The plate circuit of the high frequency oscillator is coupled to the control grid of the Type 12SG7 tube, V-109, which is employed by the multiplier. The plate circuit of the multiplier employs a parallel resonant circuit consisting of the inductor, L-101, with a trimmer capacitor in parallel. This circuit is tuned by a slug in the inductor which is controlled by the TUNING control.

Three different trimmer capacitors are used with the inductor, L-101. (See figure 8-9). The particular capacitor needed for the frequency range required to properly excite the mixer is selected by the BAND switch. The multiplier plate circuit is tuned to the fundamental and to the second and third harmonics of the frequency of the control grid voltage by condensers, C-141, C-142 and C-143, respectively. Both the fundamental and the second harmonic of the plate voltage are used to excite the mixer. When the fundamental of the multiplier plate voltage is used, one of the resistors R-145, R-146 or R-147 is connected in the circuit to reduce the output from the multiplier so that radiation from the receiver will be reduced.

The following table shows the capacitor in the multiplier plate circuit and the corresponding frequency ranges for the six positions of the BAND switch:

Band	Capacitor In Circuit	Fundamental Frequency Range MC	Harmonic Used to Excite Mixer Frequency	Range of Excitation Voltage MC
A	C-141	2 to 3	Fundamental	2 to 3
B	C-141	2 to 3	Fundamental	2 to 3
C	C-142	4 to 6	Fundamental	4 to 6
D	C-143	6 to 9	Fundamental	6 to 9
E	C-142	4 to 6	Second	8 to 12
F	C-143	6 to 9	Second	12 to 18

4. MIXER CIRCUITS.—The mixer stage combines the incoming signal voltage which has been amplified by the r-f amplifier with the excitation voltage from the frequency multiplier. The mixer employs a Type 12SG7 tube, V-102, with the signal voltage from the r-f amplifier impressed on the number one grid and the excitation voltage from the multiplier impressed on the number two grid.

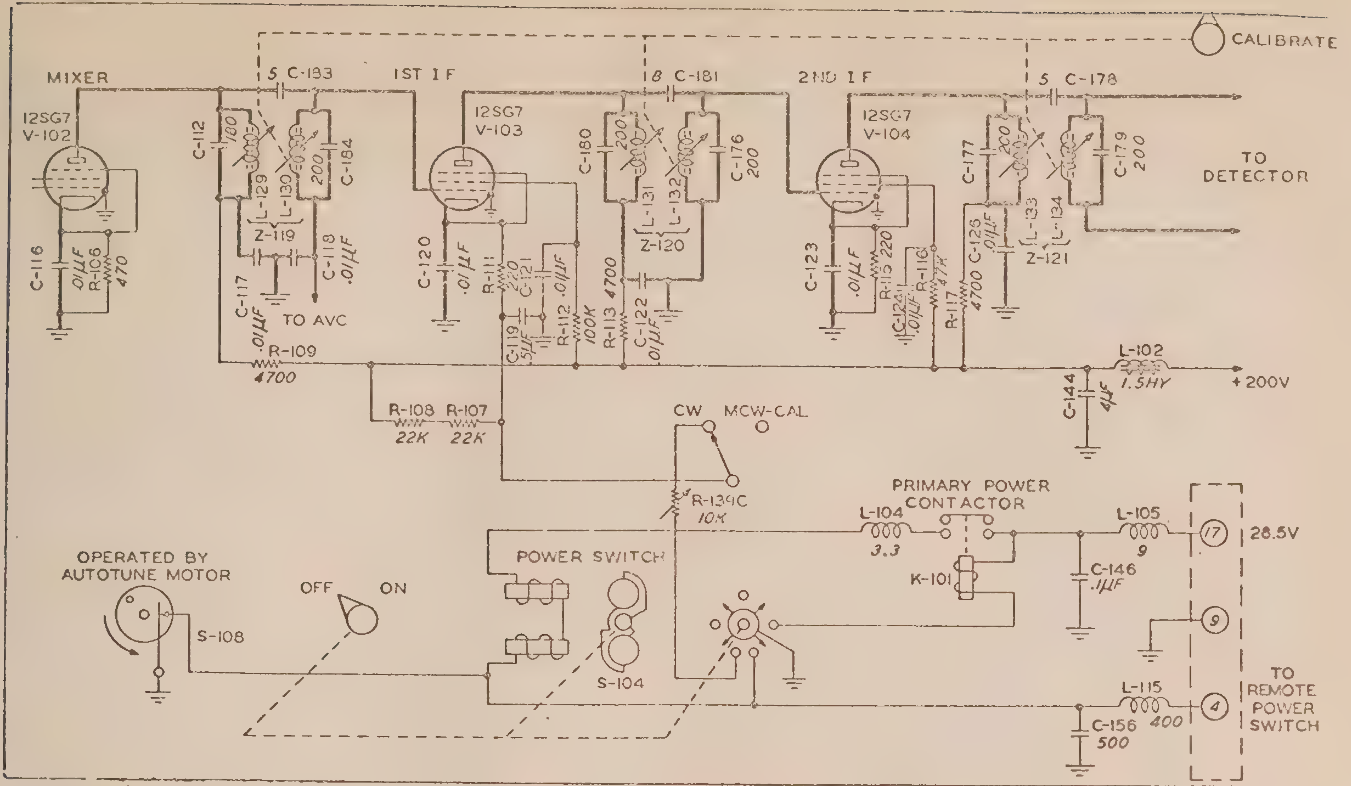
When the receiver is tuned to signals within its frequency range of one and one-half mc to 18.5 mc the frequency of the excitation voltage from the multiplier always differs from the received signal by 500 kc. The heterodyne thus produced appears in the mixer plate circuit which is tuned to a frequency of 500 kc which is the frequency of the voltage amplified by the i-f amplifiers following the mixer.

The following table shows the frequency ranges of the mixer voltages corresponding to the six positions of the BAND switch:

Band	Frequency Range of Incoming Signal MC	Frequency Range of Excitation Voltage MC	Difference Between Incoming Signal and Excitation Voltage MC
A	1.5 to 2.5	2 to 3	+0.5
B	2.5 to 3.5	2 to 3	—0.5
C	3.5 to 5.5	4 to 6	+0.5
D	5.5 to 8.5	6 to 9	+0.5
E	8.5 to 12.5	8 to 12	—0.5
F	12.5 to 18.5	12 to 18	—0.5

(b) I-F AMPLIFIER CIRCUIT. *(See figure 4-7.)*—Two tuned stages of i-f amplification, employing 12SG7 pentodes, give the receiver the selectivity that is necessary for satisfactory communication. The intermediate frequency, for normal reception, is 500 kc, but during calibration the frequency is varied as much as 50 kc either side of the 500 kc frequency by operating the CALIBRATE control.

The following table lists in order, the reference symbols, the circuit locations and the functions of the components in the i-f amplifier circuits as encountered when tracing the circuit from the mixer output to the detector input:



NOTE: Unless otherwise indicated, all resistance values are in ohms, capacitance values are in micromicrofarads, and inductance values are in microhenries.

Figure 4-7. IF Amplifier Circuits

Reference Symbols	Circuit Locations	Functions
C-116	V-102 cathode circuit	Mixer cathode bypass capacitor
C-112	V-102 plate circuit	Mixer plate tank capacitor
L-129	V-102 plate circuit	Mixer plate inductor
C-178, C-181, C-183	Z-119, Z-120, Z-121	i-f coupling capacitors
L-130	V-103 grid circuit	First i-f grid inductor
C-184	V-103 grid circuit	First i-f grid tank capacitor
C-116, C-122, C-126	V-102, V-103 and V-104 plate circuits	Plate bypass capacitors
C-118	V-103 grid circuit	avc bypass capacitor
C-120	V-103 cathode circuit	First i-f cathode bypass
C-180	V-103 plate circuit	First i-f plate tank capacitor
L-131	V-103 plate circuit	First i-f plate inductor
L-132	V-104 grid circuit	Second i-f grid inductor
C-176	V-104 grid circuit	Second i-f grid capacitor
C-123	V-104 cathode circuit	Second i-f cathode bypass capacitor
C-177	V-104 plate circuit	Second i-f plate tank capacitor
L-133	V-104 plate circuit	Second i-f plate inductor
L-134	V-105A plate circuit	Detector input inductor
C-179	V-105A plate circuit	Detector input tank capacitor

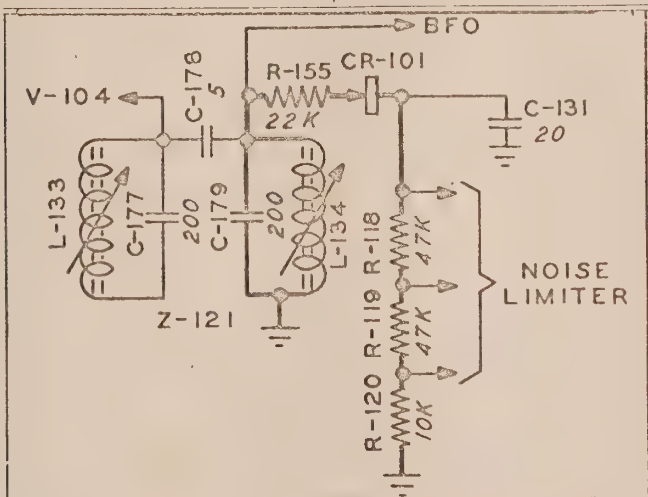
The plate tank circuit of the mixer tube, V-102, and the grid circuit of the first i-f amplifier tube, V-103, are coupled by capacitor C-183 and are tuned by the first i-f transformer Z-119. The plate tank circuit of the first i-f amplifier tube V-103, and the grid circuit of the second i-f tube V-104 are coupled by capacitor C-181 and are tuned by transformer, Z-120. Voltage for operation of the automatic volume control is coupled from the plate of the second i-f stage through capacitor C-127. The cathodes, screens, grid returns and plate returns of the i-f amplifier tubes are by-passed to ground by suitable capacitors.

(c) DETECTOR CIRCUIT. — (*Refer to figure 4-8.*) Rectification of the i-f signal is accomplished by a fixed crystal detector in the AN/ARR-15 equipment and by a diode connected triode in the AN/ARR-15A. The detector is excited by i-f voltage taken from the secondary of the last i-f transformer, Z-121. The output of the detector is coupled through a noise limiter circuit to the grid of the audio driver tube.

The following tables list in order the reference symbols, the circuit locations, and the functions of the components in the detector circuit as encountered when tracing the circuit from the detector input to the audio output. The first table is for the AN/ARR-15, the second for the AN/ARR-15A.

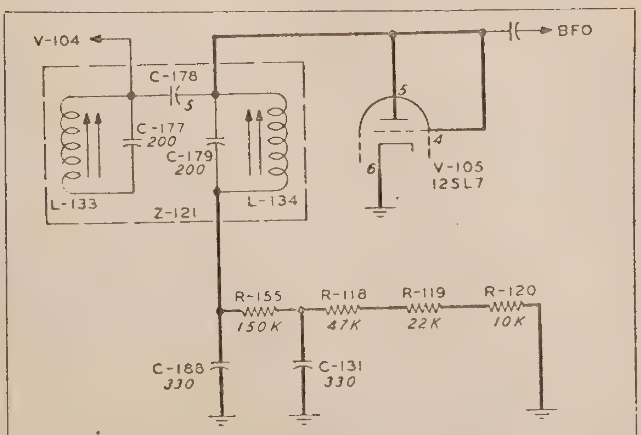
Reference Symbols	Circuit Locations	Functions
L-134	In series with crystal	Input inductor
CR-101	Output of L-134	Rectifier
C-131	Between CR-101 and R-118	r-f filter
R-155	Between CR-101 and Z-121	Detector load
R-118	Between CR-101 and R-119	Detector load
R-119	Between R-118 and R-120	Voltage divider
R-120	Between R-119 and ground	Voltage divider

Reference Symbols	Circuit Locations	Functions
L-134	In series with crystal	Input inductor
V-105	Output of L-134	Detector
C-188	Between L-134 and ground	r-f by-pass
R-155	Between C-188 and R-118	Detector load
C-131	Between R-155 and ground	r-f filter
R-118	Between R-155 and R-119	Detector load
R-119	Between R-118 and R-120	Voltage divider
R-120	Between R-119 and ground	Voltage divider



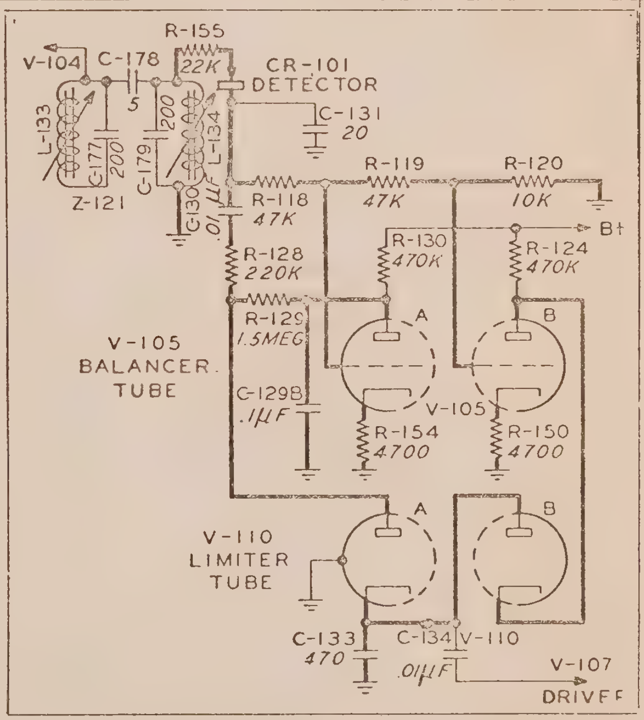
NOTE: Unless otherwise indicated, all resistance values are in ohms, capacitance values are in micromicrofarads, and inductance values are in microhenries.

Figure 4-8. Detector Circuits (AN/ARR-15)



NOTE: Unless otherwise indicated, all resistance values are in ohms, capacitance values are in micromicrofarads, and inductance values are in microhenries.

Figure 4-8A. AN/ARR-15A Detector Circuit



NOTE: Unless otherwise indicated, all resistance values are in ohms, capacitance values are in micromicrofarads, and inductance values are in microhenries.

Figure 4-9. Noise Limiter Circuit

The crystal detector receives excitation from the secondary of i-f transformer Z-121 which is tuned to the i-f frequency by capacitor C-179. Load resistors R-155 and R-118, and voltage divider resistors R-119 and R-120 form the load for the detector. Audio output from the detector is taken from various points along the detector load. The audio reaches audio driver tube V-107 through the noise limiter circuits.

(d) NOISE LIMITER. — The noise limiter

employed in this equipment uses two tubes, a dual triode and a dual diode. This limiter will eliminate or greatly attenuate sharp noise impulses such as ignition noise, radar, etc., from the receiver output. Located between the detector and the first audio stage, the limiter acts like a gate, cutting off the audio for the instant of the noise impulse and immediately restoring it at the end of the noise impulse duration.

The following tables list in order, the reference symbols, the circuit locations, and the functions of the components in the noise limiter circuits as encountered when tracing the circuit from the detector output to the noise limiter output. The first table is for the AN/ARR-15, the second for the AN/ARR-15A.

In the AN/ARR-15, the dual triode, a type 12SL7 tube, is employed in a balancer circuit which

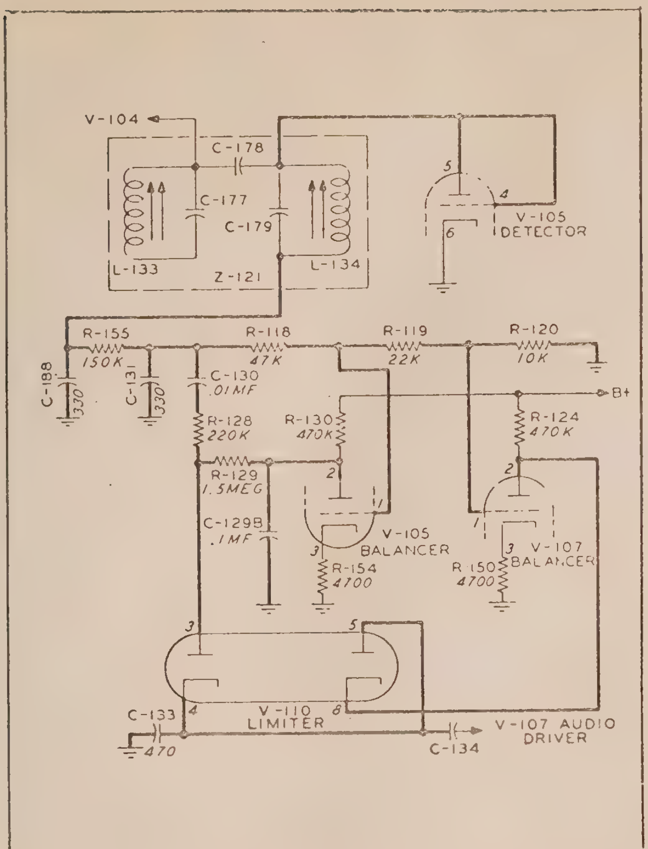
Reference Symbols	Circuit Locations	Functions
C-131	Between crystal and R-118	r-f filter
R-155	Between crystal and Z-121	Detector load
R-118	Between crystal and R-119	Detector load
R-119	Between R-119 and R-120	Voltage divider
R-120	Between R-120 and ground	Voltage divider
C-130	Between R-118 and R-128	Impulse coupling capacitor
R-128	Between C-130 and plate of section A of V-110	Impulse coupling resistor
R-129	Between plate of section A of V-105 and plate of section A of V-110	Limiter time constant resistor
R-130	Plate of section A of V-105	Balancer tube plate resistor
R-124	Plate of section B of V-105	Balancer tube plate resistor
R-154	Cathode of section A of V-105	Balancer tube cathode resistor
R-150	Cathode of section B of V-105	Balancer tube cathode resistor
C-129B	Plate of section A of V-105	Plate filter
C-133	Cathode of section A of V-110	Noise limiter time constant capacitor
C-134	Cathode of section A of V-110	Audio coupling capacitor

Reference Symbols	Circuit Locations	Functions
C-188	Between L-134 and ground	r-f filter
R-155	Between C-188 and R-118	Detector load
C-131	Between R-155 and ground	r-f filter
R-118	Between R-155 and R-119	Detector load
R-119	Between R-118 and R-120	Voltage divider
R-120	Between R-119 and ground	Voltage divider
C-130	Between R-118 and R-128	Impulse coupling capacitor
R-128	Between C-130 and plate of section A of V-110	Impulse coupling resistor
R-129	Between plate of section A of V-105 and plate of section A of V-110	Limiter time constant resistor
R-130	Plate of section A of V-105	Balancer tube plate resistor
R-124	Plate of section B of V-107	Balancer tube plate resistor
R-154	Cathode of section A of V-105	Balancer tube cathode resistor
R-150	Cathode of section B of V-107	Balancer tube cathode resistor
C-129B	Plate of section A of V-105	Plate filter
C-133	Cathode of section A of V-110	Noise limiter time
C-134	Cathode of section A of V-110	Audio coupling capacitor

amplifies and furnishes an automatic threshold level in order that the limiter will operate equally effective on all percentages of modulation. In the AN/ARR-15A, this function is performed by Section A of V-105 and Section B of V-107.

The dual diode, a type 12H6 tube, is the noise limiter tube in which the interruption of the audio signal takes place.

In operation, both grids of the triode sections receive bias variations at the rate of the audio frequency by virtue of being connected to the detector load resistor. The plate current of section B of V-105 (ARR-15, V-107 in ARR-15A) varies at the audio rate and is coupled to the cathode of section B of the limiter tube, V-110. The plate current of section A of V-105 varies at an average rate due to filter components C-129B, R-129 and C-133. The plate loading resistors R-130 and R-124 are chosen so that with no audio excitation from the detector, the positive voltage on the plate of section A of V-110



NOTE: Unless otherwise indicated, all resistance values are in ohms, capacitance values are in micromicrofarads, and inductance values are in microhenries.

Figure 4-9A. AN/ARR-15A Noise Limiter Circuit

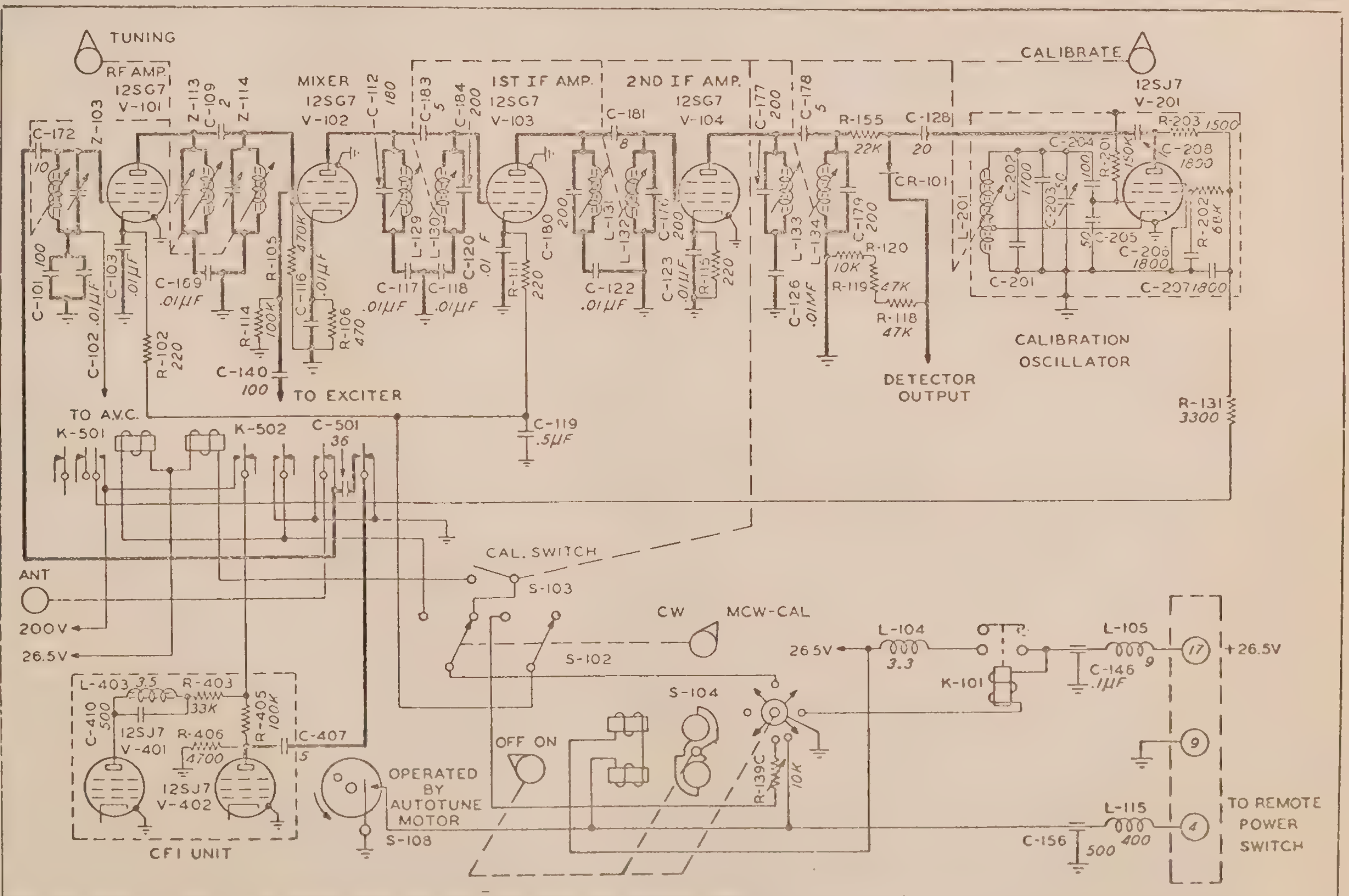
is slightly higher than the positive voltage on the cathode of section B of V-110 resulting in a current flow through the limiter tube. Since the plate of section B of V-105 (V-107 in ARR-15A) is coupled to the cathode section B of V-110 an audio signal is obtained from the output of the limiter tube, V-110. If a noise impulse with a steep wave front is received, the grid of section B of V-105 (V-107 in ARR-15A) will be driven more negative which will cause a rise in plate voltage in section B of V-105 (V-107 in ARR-15A). The cathode of section B of the limiter tube V-110, being connected to the plate of section B of V-105 (V-107 in ARR-15A), therefore, is driven more positive than the plate of section A of V-110 and the current flow through the limiter tube is interrupted causing a hole to be punched in the signal. While the grid of section A of V-105 receives the same impulse as the grid of section B (section B of V-107 in ARR-15A), the plate of section A does not follow the noise impulse due to the time constant of the filter components C-129B, R-129 and C-133, therefore the plate of section A of limiter tube V-110 does not receive the noise impulse in phase with the cathode of section B of V-110, however the noise impulse is coupled to the plate of section A through resistor R-128 and capacitor C-130 and arrives out of phase, which tends to lower the positive plate potential thus aiding in reversing the polarity between the plate of section A and the cathode of section B of limiter tube V-110, since the plate potential of section A of V-105 varies at an average rate directly proportional to the strength of the incoming signal, the noise limiter threshold is automatically set and the limiter is effective on all values of modulation. The output of limiter tube V-110 is coupled to the grid of the driver tube, V-107, by capacitor C-134.

(e) CALIBRATION CIRCUIT. — The calibrator that is incorporated in this receiving equipment utilizes a crystal controlled oscillator, a variable frequency oscillator and a variable frequency i-f channel. Using the above circuits, the receiver may be accurately tuned to any frequency in the range 1500 to 18,500 kc without having to follow the usual procedure of tuning for a transmitted signal or depending upon tuning dial calibration.

The following table lists in order, the reference symbols, the circuit locations and the functions of the components in the calibration circuit as encountered when tracing the circuit from the output of the cfi unit to the beat frequency calibration oscillator. (Refer to figure 4-10.)

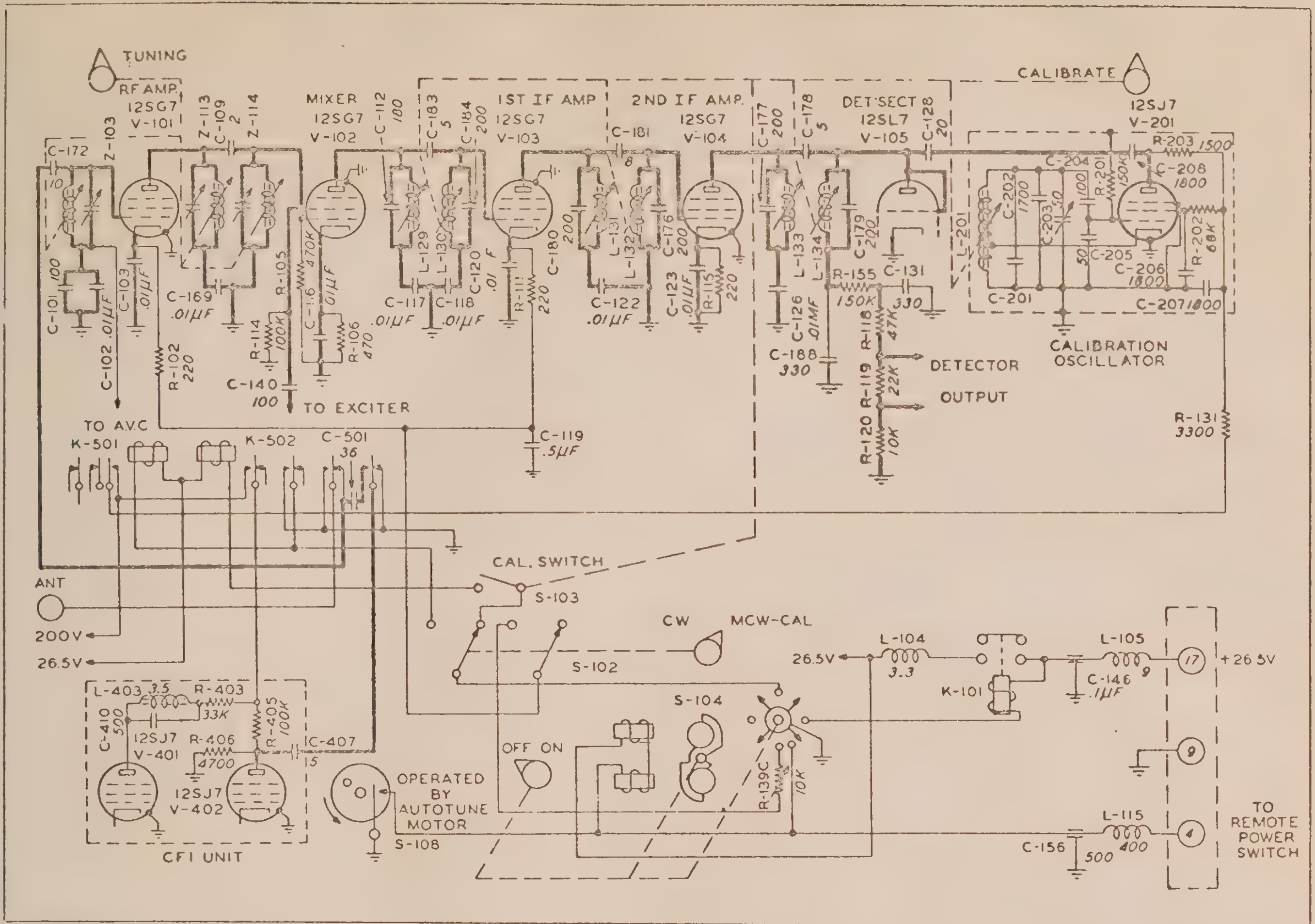
Reference Symbol	Circuit Location	Function
C-407	V-201 plate	Coupling capacitor
C-501	Between K-502 and S-101A	Calibration input capacitor
C-170, C-171, C-172, C-173, C-174, C-175	V-101 grid circuit	Antenna coupling capacitors
Z-101, Z-102, Z-103, Z-104, Z-105, Z-106	V-101 grid circuit	r-f amp grid inductors
C-101, C-102, C-118	V-101, V-103	avc bypass capacitors
C-103, C-120, C-123	V-101, V-103 and V-104 cathodes	Cathode bypass capacitors

Reference Symbol	Circuit Location	Function
Z-107, Z-108, Z-109, Z-110, Z-111, Z-112, Z-113, Z-114, Z-115, Z-116, Z-117, Z-118	V-101 plate, V-102 grid circuits	r-f amplifier band pass inductors
C-105, C-106, C-107, C-108, C-109, C-111, C-113, C-114	V-101 plate, V-102 grid circuits	Band pass capacitors
C-115	V-102 grid circuit	Mixer grid coupling
L-129	V-102 plate circuit	Mixer plate inductor
L-130	V-103 grid circuit	First i-f grid inductor
C-112	V-102 plate circuit	Mixer plate tanks
C-178, C-181, C-183	Z-119, Z-120 and Z-121	i-f coupling capacitors
C-184	V-103 grid	First i-f grid tank capacitor
C-140	Between V-109 plate and grid 2 of V-102	Exciter coupling capacitor
C-117, C-122, C-126	V-102, V-103, V-104 plate circuits	Plate bypass capacitors
L-131	V-103 plate circuit	First i-f plate inductor
L-132	V-104 grid circuit	Second i-f grid inductor
C-176	V-104 grid circuit	Second i-f grid tank capacitor
C-180	V-103 plate circuit	First i-f plate tank capacitor
L-133	V-104 plate circuit	Second i-f plate inductor
L-134	V-105A plate circuit	Detector input inductor
C-177	V-104 plate circuit	Second i-f plate tank capacitor
C-179	V-105A plate circuit (V-105B in ARR-15A)	Detector input tank capacitor
C-128	V-105A plate circuit (V-105B in ARR-15A)	l-f osc coupling
C-208	V-201 plate circuit	l-f osc output coupling



NOTE: Unless otherwise indicated, all resistance values are in ohms, capacitance values are in micromicrofarads, and inductance values are in microhenries.

Figure 4-10. Calibration Circuit (AN/ARR-15)



NOTE: Unless otherwise indicated, all resistance values are in ohms, capacitance values are in micromicrofarads, and inductance values are in microhenries.

Figure 4-10A. AN/ARR-15A Calibration Circuits

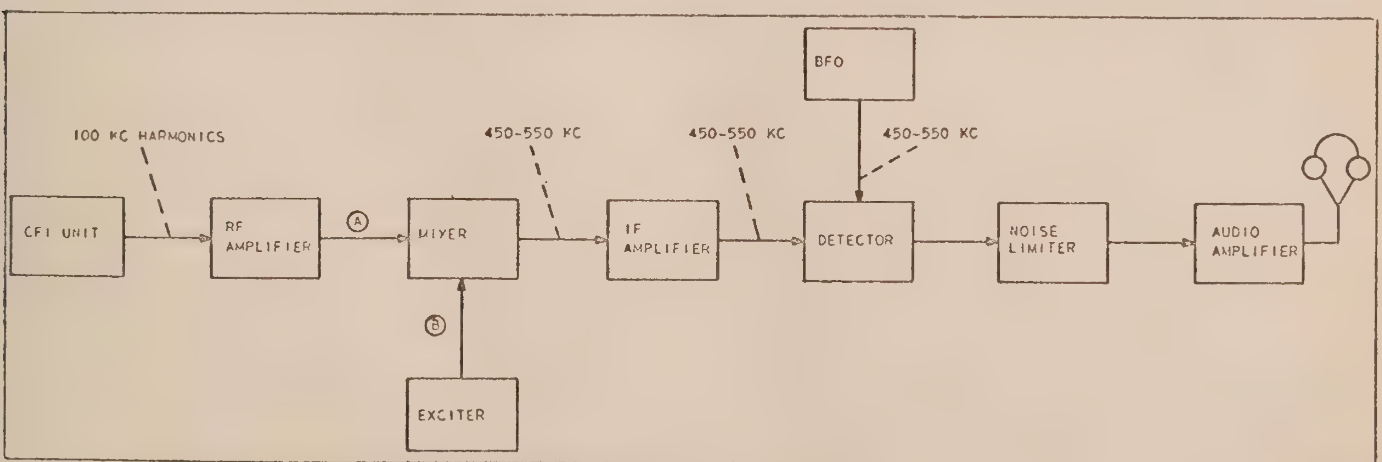


Figure 4-11. Calibration System

The block diagram, figure 4-11, shows, in simplified form, the operation of the receiver calibration system. This system of receiver calibration depends primarily upon the frequency stability of the cfi oscillator and the frequency stability of the two variable frequency oscillators. The frequency of the cfi oscillator is controlled by a 100 kc quartz crystal. The variable frequency oscillators are precision built and are exceptionally stable. The low frequency oscillator has been carefully calibrated and it is reasonable to expect that the calibration dial will always indicate the proper number

of kilocycles of deviation from the 500 kc intermediate frequency. The frequency of the low frequency oscillator is varied by operating the CALIBRATE control. This control operates a mechanism which changes the positions of the tuning slug within the l-f osc grid inductor and the tuning slugs within the i-f transformers.

During the process of receiver calibration the frequency of the output of the low frequency osc is set and the frequency of the high frequency osc is varied. It is most important that this procedure be followed when calibrating the receiver. Reversing the operation by setting the TUNING control and varying the CALIBRATE control will result in a "trial and error" method of calibration and consequently considerable loss of time. If, after once calibrating the receiver for a particular frequency, it is desired to change the calibration even slightly, the low frequency osc frequency should be set and the exciter tuned until zero beat is again obtained.

In order to determine the correct setting of the TUNING control for any particular frequency, a condition must be reached where the frequency of the output of the mixer stage is the same frequency as the output of the low frequency osc. When calibrating the receiver a signal that is generated by the cfi oscillator is used to replace the usual transmitted signal. To obtain output from the mixer that is in the frequency range 450 to 550 kc, the output of the cfi oscillator is beat against the output of the exciter. As indicated in the table below, the frequency of the output of the exciter is sometimes 500 kc higher and sometimes 500 kc lower than the frequency of the signal that is being received. In Bands A, C, and D the frequency of the output of the exciter is 500 kc higher than the frequency of the signal that is being fed into the mixer by the r-f amplifier. In Bands B, E, and F, the frequency of the output of the exciter is 500 kc lower than the frequency of the signal that is being impressed upon the signal grid of the mixer.

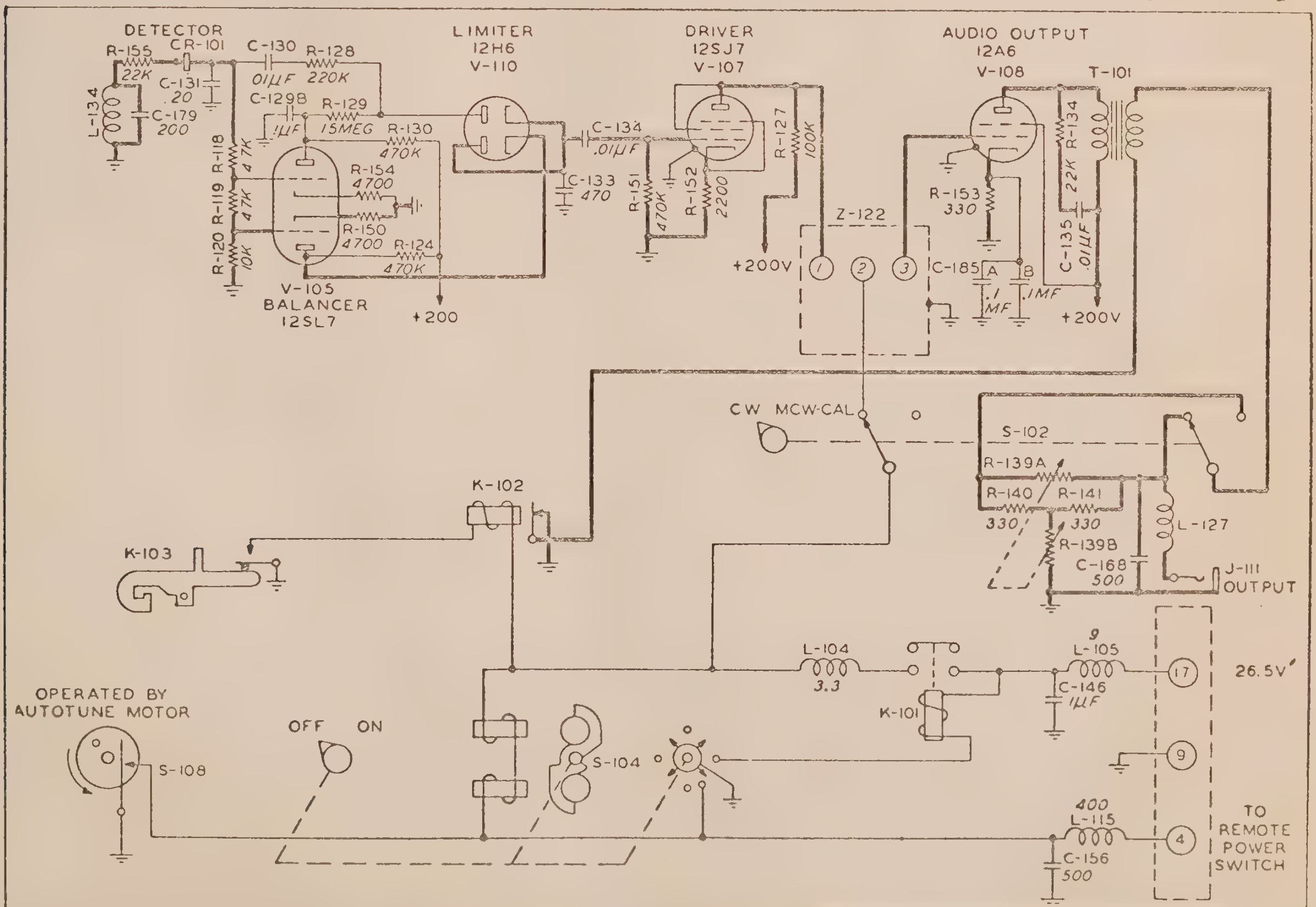
Band	Frequency Range	HF Ocs Frequency	Injection Voltage Frequency	Received Freq. Compared to Injection Freq.
A	1.5 mc to 2.5 mc	2 mc to 3 mc	2 mc to 3 mc	—0.5 mc
B	2.5 mc to 3.5 mc	2 mc to 3 mc	2 mc to 3 mc	+0.5 mc
C	3.5 mc to 5.5 mc	2 mc to 3 mc	4 mc to 6 mc	—0.5 mc
D	5.5 mc to 8.5 mc	2 mc to 3 mc	6 mc to 9 mc	—0.5 mc
E	8.5 mc to 12.5 mc	2 mc to 3 mc	8 mc to 12 mc	+0.5 mc
F	12.5 mc to 18.5 mc	2 mc to 3 mc	12 mc to 18 mc	+0.5 mc

When calibrating the receiver, the output of the cfi oscillator is fed into the receiver input circuit and the antenna terminal is grounded by the operation of K-502. All harmonics of the 100 kc oscillator are fed into the receiver but tunable band pass filter circuits in the r-f amplifier and mixer stages attenuate all signals except the harmonic that is to be used for calibration. Although attenuated, the 100 kc harmonic that is to be used will be of sufficient strength to drive the signal grid of the mixer even when the band pass filter and tank circuits are detuned as much as 50 kc. The high frequency osc tank and multiplier tank circuits are tuned by the same control that tunes the r-f amplifier and mixer tank circuits. Thus when the r-f amplifier and mixer tank circuits are detuned from the 100 kc point, the frequency of the output of the exciter is also varied. A 100 kc harmonic of the cfi oscillator is used for calibration 50 kc above and 50 kc below the point. For example, the 4600 kc harmonic of the 100 kc crystal is used when calibrating the receiver to points in the frequency range 4550 to 4650 kc. The 4500 and the 4600 kc harmonics will be of equal strength at 4550 kc and the 4600 and the

4700 kc harmonics will be of equal strength at 4650 kc. When the r-f amplifier, mixer and exciter circuits are tuned farther than 50 kc away from a 100 kc point, the 100 kc harmonic that is nearest to the frequency to which the r-f, mixer and exciter circuits are tuned becomes the usable signal.

Referring to the block diagram, figure 4-11, the frequency of the usable signal at point A is always an even 100 kc harmonic of the output 100 kc cfi oscillator. The frequency of the signal at point B will vary as the TUNING control is rotated but will always be between 450 and 550 kc higher or lower in frequency than the frequency of the signal at point A. When receiving signals in Bands A, C or D, the frequency of the signal at point A will be lower than the frequency of the signal at point B. When receiving in Bands B, E or F the frequency of the signal at point A will be higher than the frequency of the signal at point B. With the if transformers tuned to the same frequency as the output of the low frequency oscillator, the output of the mixer will be permitted to reach the detector tube when the frequency of the output of the mixer is near the frequency of the output of the low frequency oscillator. Zero beat between these two signals indicates that the output of the mixer is of exactly the same frequency as the frequency of the output of the lf osc. The receiver is properly calibrated when zero beat between the two signals is obtained.

(f) AUDIO AMPLIFIER CIRCUITS. — Audio amplification is obtained by one audio driver and one power amplifier stage. The audio voltage that is developed across the diode detector load resistors, R-155, R-118, R-119, and R-120, is impressed across the noise limiter circuit. The current flowing in the limiter tube develops voltage across resistor, R-151. This voltage is applied to the grid of the audio driver V-107 through capacitor C-134. The output of the audio driver V-107 is connected to the input of the audio filter Z-122. The filtered audio voltage is impressed on the grid of the 12A6 power amplifier tube V-108. An output transformer couples the output of the power amplifier to the head phone jack, J-111, through the mcw-cw switch, S-102. A "T" pad attenuator is inserted in series with the output when S-102 is in the MCW position. The audio output is also terminated at pin No. 11 of connector P-101. Operating this switch to CW position takes the "T" pad out of the circuit and disables the avc. Relay contacts on the audio disabling relay K-102 open



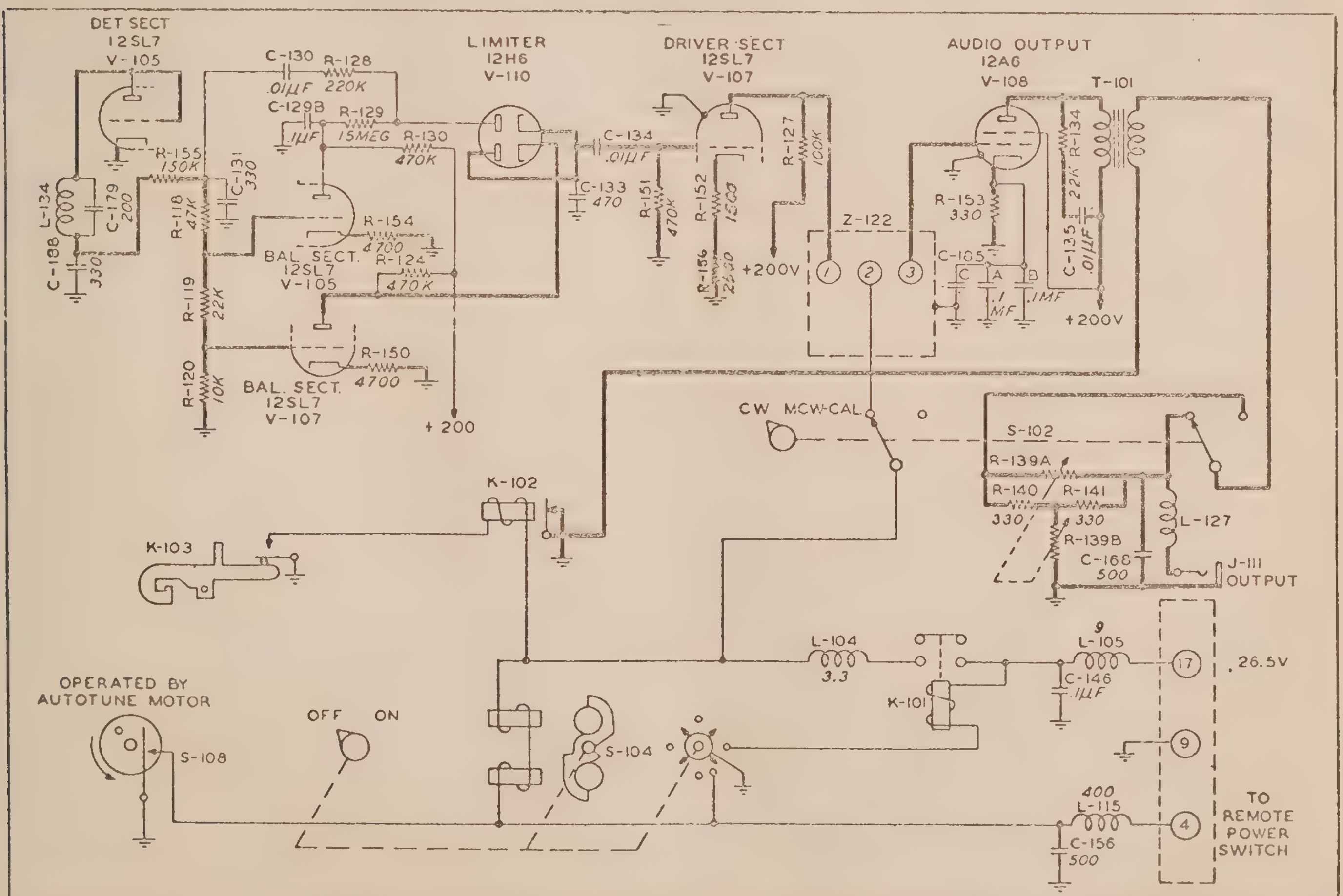
NOTE: Unless otherwise indicated, all resistance values are in ohms, capacitance values are in micromicrofarads, and inductance values are in microhenries.

Figure 4-12. Audio Amplifier Circuit

the secondary circuit of the audio transformer, T-101, when the Autotune system is functioning.

The following table lists in order, the reference symbols, the circuit locations and the functions of the components in the audio amplifier circuits as encountered when tracing the circuit from the noise limiter output to the audio output connector jack:

Reference Symbol	Circuit Location	Function
C-134	V-107 grid circuit	First audio coupling capacitor
R-151	V-107 grid circuit	Audio driver grid resistor
R-131	Terminal 3 of J-105	I-f osc decoupling resistor
R-127	V-107 plate circuit	Audio driver plate load resistor
Z-122	V-107 plate, V-108 grid	Audio filter
S-102	One section connects Z-122 in circuit	cw-mcw-cal switch
R-153	V-108 cathode	Audio output cathode resistor
C-185	V-108 cathode	Audio output cathode capacitor
R-134, C-135	Connected in series across T-101 primary	Audio equalization network
T-101	V-108 plate circuit	Audio output transformers
R-139A	Connects to R-140 and R-141	"T" pad bridging resistor
R-139B	Connects junction of R-140, R-141 to ground	"T" pad resistor
R-140	Series with R-141 and T-101 secondary	"T" pad resistor
R-141	Series with R-140 and J-111	"T" pad resistor
C-168	Shunted across J-111	Phone jack filter capacitor
L-127	Series with J-111	Audio output r-f filter
J-111	Connected to L-127 and ground	Audio output jack
K-102	Connects one side of T-101 secondary to ground	Receiver disabling relay



NOTE: Unless otherwise indicated, all resistance values are in ohms, capacitance values are in micromicrofarads, and inductance values are in microhenries.

Figure 4-12A. AN/ARR-15A Audio Amplifier Circuits

(g) AUTOMATIC VOLUME CONTROL. — Delayed avc is employed in this receiver. An accelerated characteristic which enables the avc circuit to reach maximum efficiency on strong signals is a feature of the circuit. Refer to figure 4-13.

The following table lists, in order, the reference symbols, the circuit locations, and the functions of the components in the i-f amplifier circuits as encountered when tracing the circuit from the avc input to the grids of the controlled tubes.

Reference Symbols	Circuit Locations	Functions
C-132	Plate of section A of V-106	Accelerator r-f coupler
C-127	Plate of section B of V-106	AVC r-f coupler
R-123	Plate of section A of V-106	Accelerator plate load
R-126	Cathode of section A of V-106	Accelerator plate load
R-122	Cathode of section A of V-106	Voltage divider resistor
R-133	Between R-122 and ground	Voltage divider resistor
C-129A	Cathode of section B of V-106	Filter capacitor
R-121	Plate of section B of V-106	AVC load
R-125	Plate of section B of V-106	Filter and time constant resistor
C-129C	Between R-125 and ground	Filter and time constant capacitor
R-111	Grid return of V-103	AVC decoupling
C-118	Grid return of V-103	AVC decoupling
R-102	Grid return of V-101	AVC decoupling
C-101, C-102	Grid return of V-101	AVC decoupling

The delay feature of the avc functions in such a fashion that the controlled tubes do not receive any avc voltage while a weak signal is being received, thereby allowing the receiver to operate in the most sensitive condition. This delay feature is obtained by placing a positive voltage on the avc tube cathode which biases the plate with a negative potential and prevents rectification. However, as soon as the received signal is great enough in amplitude, the signal voltage overcomes the fixed bias and the avc tube begins to function. In order to receive all avc voltage possible from the avc tube,

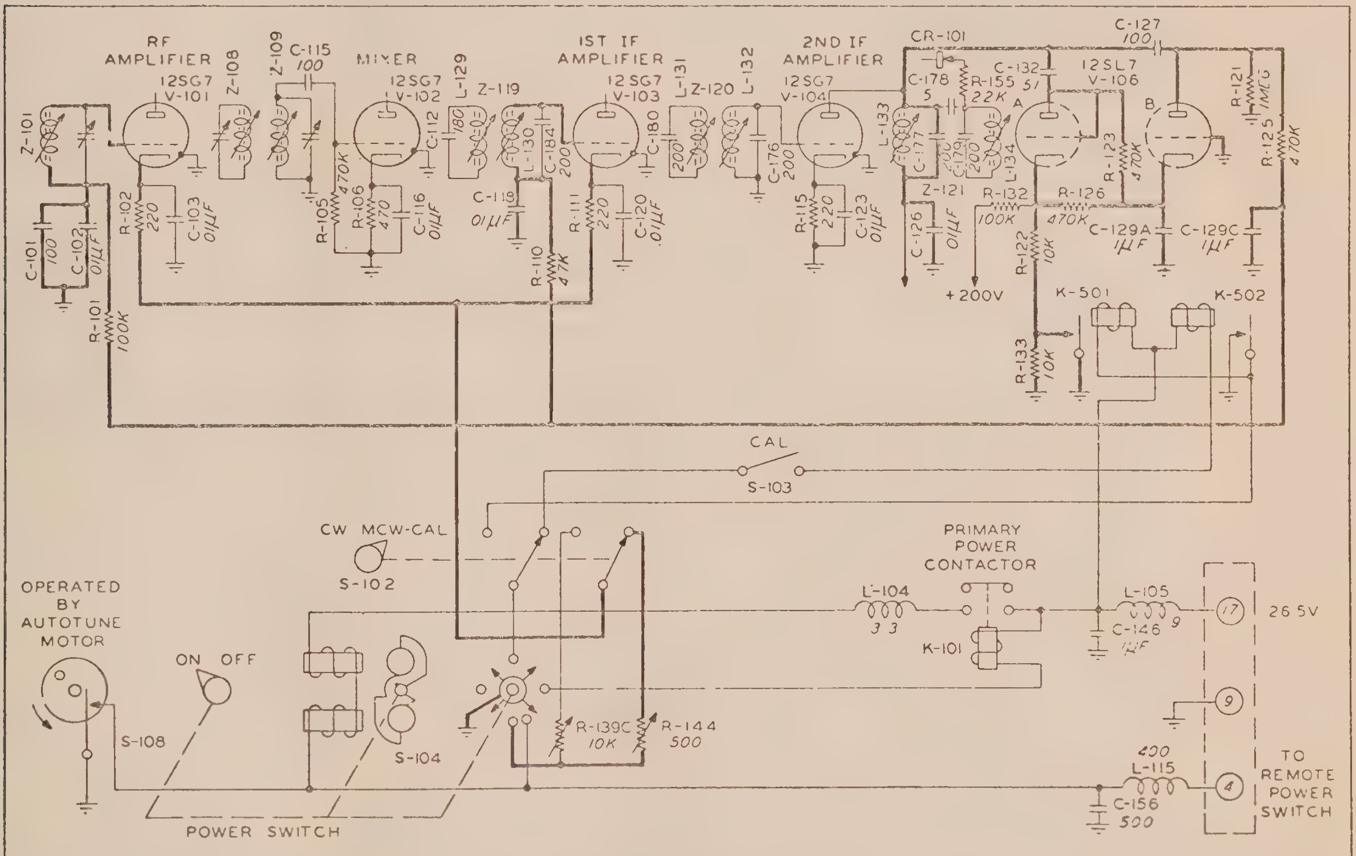
section A of V-106 is connected in a rectifier circuit which rectifies part of the i-f signal and applies a d-c bucking voltage to the delay bias on section B of V-106. In this manner, a strong signal will reduce the delay bias on the avc tube and allow more avc voltage to be generated, thus an accelerated avc characteristic is obtained.

Radio frequency voltage for operation of the avc system is obtained from the primary of i-f transformer Z-121 through capacitor C-127. Resistor R-121 forms the avc load. The grid of the avc tube, section B of V-106, is grounded and the cathode is connected to the positive side of the plate supply through resistors R-126 and R-132.

Section A of V-106 is connected in a diode rectifier circuit which furnishes the bucking voltage that cancels out the delay bias on section B of V-106.

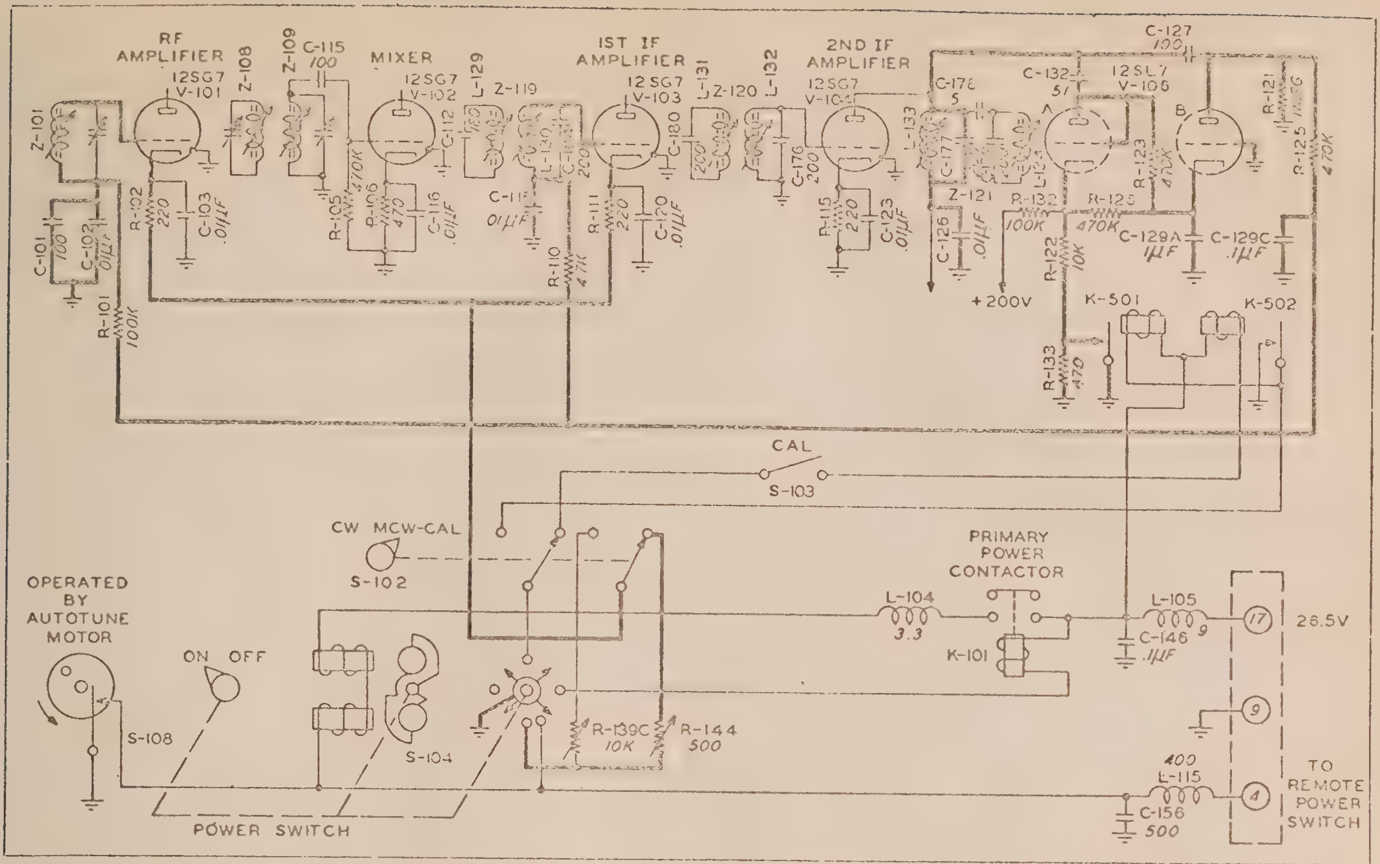
Resistor R-125 and capacitor C-129 form a filter to remove all r-f and audio from the avc voltage. Suitable resistors and capacitors are connected in the avc supply line at the grid returns of the controlled tubes for decoupling purposes.

The avc circuit is connected to a set of contacts on the cw-mcw relay, K-501. The operation of relay K-501 applies a higher positive potential (delay bias) to the avc circuit and causes the avc to become partially inoperative when cw is selected.



NOTE: Unless otherwise indicated, all resistance values are in ohms, capacitance values are in micromicrofarads, and inductance values are in microhenries.

Figure 4-13. Automatic Volume Control Circuit



NOTE: Unless otherwise indicated, all resistance values are in ohms, capacitance values are in micromicrofarads, and inductance values are in microhenries.

Figure 4-13A. AN/ARR-15A Automatic Volume Control Circuits

SECTION V
MAINTENANCE

1. INSPECTION.

a. GENERAL.—This radio equipment has been constructed of materials considered to be the best obtainable for the purpose and has been carefully inspected and adjusted at the factory to reduce maintenance to a minimum. However, a certain amount of checking and servicing will be necessary to maintain efficient and dependable operation. The following sections have been set up to aid in the checking of the equipment. The inspection procedure is divided into three periods, namely, pre-flight inspection, daily inspection and 100 hour inspection.

b. PRE-FLIGHT INSPECTION.—The purpose of the pre-flight check is to make certain that the equipment is functioning properly and that all parts are securely fastened.

(1) VISUAL INSPECTION.

(a) Check the Autotune locks on the BAND switch and the TUNING control and make certain that both are tight.

(b) Check the antenna and the ANTENNA terminal connection.

(c) Check the mounting base and make certain that the base is securely fastened to the structure of the aircraft and grounded.

(d) Check the condition of the securing clamps on the mounting base and the safety wires that hold the clamp nuts in place.

(e) Check the remote control unit and make certain that the unit is securely fastened.

(f) Check all of the interconnecting wires. If necessary, hand tighten all of the wire plug locking rings. Inspect the interconnecting wires for breaks and loose connections at the plugs.

(g) Check the headphones for loose or broken wires.

(h) Make all other checks that may aid in accomplishing the "purpose" of this inspection.

(2) OPERATION CHECK.—Before each flight the operation of the receiver should be checked. The following operational check will indicate whether or not the receiver is operating normally.

(a) Operate the ON-OFF switch to the ON position and allow a few seconds for the tubes to warm up.

(b) Advance the VOLUME control for the desired audio output.

(c) Select each of the ten frequency channels and listen for a signal of known strength. If a signal is heard on each of the frequency channels the receiver may be assumed to be operative.

c. DAILY INSPECTION.

(1) GENERAL. — The daily inspection is designed to determine, in general, the condition of the complete equipment and to detect any aggravated conditions, maladjustments, breaks, etc.

(2) VISUAL INSPECTION. — The visual inspection for the daily inspection is the same as for the pre-flight check. Refer to paragraph 1. *b.*, on this page.

(3) OPERATIONAL INSPECTION.

(a) PROCEDURE.

1. Check the receiver for sensitivity against stations of known frequency and signal strength on all channels.

2. Check the controls of the remote control unit.

3. Make certain the dynamotor is running smoothly.

d. 100 HOUR INSPECTION.

(1) GENERAL.—This inspection involves removal of the chassis and should be a thorough and searching visual and operating inspection designed to determine the amount of service that is required and to detect maladjustments and early stages of deterioration of components.

(2) REMOVING RECEIVER CHASSIS.—The first step in the procedure is to remove the receiver from the mounting base. Unfasten the safety wires on the two nuts at the bottom of the front panel and loosen the nuts. Slide the unit forward until the plug and plug receptacle are disengaged. Lift the unit from the mounting rack and place on a bench. Disengage the Dzus fastener at the rear of the cabinet and pull the unit forward to remove the chassis from the cabinet.

(a) REMOVING THE DYNAMOTOR UNIT. —To remove the dynamotor from the receiver chassis, pull out the four snap fasteners at the dynamotor base. The dynamotor will lift out of the plug-in connector located in the base.

(b) VISUAL INSPECTION.

1. With the dynamotor removed from the equipment, remove the dynamotor end shields and check the commutator and brushes for wear.

2. Check the tubes to make certain that all are tight in the sockets.

3. Check all the moving parts in the receiver and any other parts that may have become loose due to vibration.

4. Check the capacitors, resistors and other components for corrosion and deterioration.

5. Check all of the relay and switch contacts for corrosion and pits.

(3) OPERATIONAL INSPECTION.

(a) EQUIPMENT REQUIRED.

1. Power supply—26 volts dc.

2. Mounting base with plug.

3. Connecting cable.

4. Headphones.

5. Signal generator.

6. Dummy antenna—10 ohms, 100 mmf.

7. Output meter.

(b) MANUAL OPERATIONAL CHECK.—Make certain all the controls are operating properly. Check the CHANNEL, TUNING, CALIBRATE, VOLUME, CW MCW-CAL controls on the front panel.

(c) AUTOMATIC OPERATION OPERATIONAL CHECK.

1. Plug the receiver unit into the mounting base and connect the cable to a 26.5 volt dc supply.

2. Plug the headphones into the PHONE jack.

3. Connect a ground to the receiver mounting base.

(d) CHECKING PROCEDURE.

1. Lock the TUNING and BAND switch controls.

2. Rotate the ON-OFF switch to the ON position and select channel number one with the CHANNEL selector control.

3. Select each of the ten channels after the Autotune cycle has been completed for each channel.

(e) RECEIVER SENSITIVITY CHECK.

1. Connect a signal generator to the ANTENNA terminal of the receiver through a dummy antenna that consists of 10 ohms non-inductive resistance and 100 mmf of capacitance in series.

2. Connect an output meter to the receiver output.

3. Rotate the ON-OFF switch to the ON position and rotate the CHANNEL selector switch to channel one.

4. Check the sensitivity of the receiver against the table of "Sensitivity vs Frequency" given on this page of this Handbook.

5. Check the sensitivity on all ten channels.

SENSITIVITY vs FREQUENCY

Frequency (mc)	Band	Input (uv)	Output (mw) (30% mod)
2.0	A	2.4	100
3.0	B	2.0	100
4.5	C	2.5	100
7.0	D	2.5	100
10.0	E	2.3	100
15.5	F	2.5	100

2. VACUUM TUBES.

a. PRECAUTIONS FOR SATISFACTORY TUBE LIFE.

(1) Before any tube is removed from the receiver, make certain that the ON-OFF switch is in the OFF position.

(2) The external power supply must not exceed 28 volts. (Normal voltage 26.5 volts dc.)

(3) Operate all of the tubes within five per cent of the rated voltages.

(4) Do not exceed the rated plate current of any of the tubes during normal operation of the equipment.

b. TUBE REPLACEMENT PRECAUTIONS.

(1) All tubes are removed by pulling straight out of the sockets.

(2) Before a tube is replaced, make certain that the type of tube is correct for the socket into which it is being placed.

(3) When replacing the tubes, properly orient the tube pins with respect to the socket and push into place.

c. REPLACEMENT OF TUBES.—Before a tube is discarded, make certain that the tube is at fault and that the trouble is not a loose or broken connection in the equipment. When a tube is known to be defective it should be disposed of immediately so that the tube will not become mixed with good tubes from general stock. Discard all tubes with open heaters, shorted or noisy elements, low emission or any other defect which would cause faulty operation of the equipment. If the tubes in the equipment have been continually in use for a year, replace all the tubes. A marked improvement in performance of the equipment is usually noticeable after the weak tubes have been replaced.

Note

ALL TUBES OF A GIVEN TYPE SUPPLIED WITH THE EQUIPMENT SHALL BE CONSUMED PRIOR TO EMPLOYMENT OF TUBES FROM GENERAL STOCK.

3. TROUBLE LOCATING IN INSTALLED EQUIPMENT.

a. GENERAL.—In case of trouble, look for simple

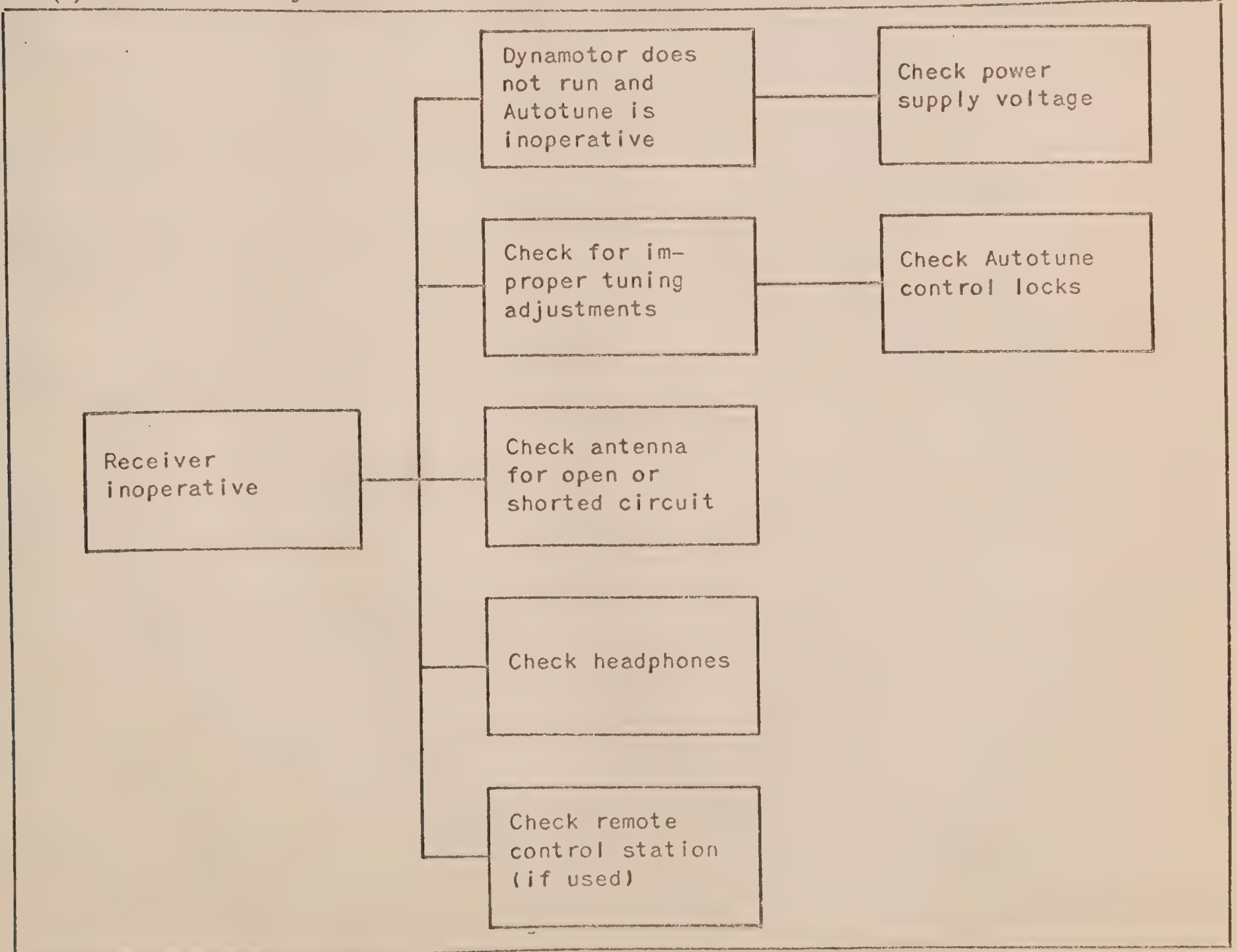
causes first. Analyze and isolate the difficulty before attempting to remove or dismantle any part of the equipment. A few moments of thought and study of the various possible causes of failure may save hours of haphazard labor. Radio equipment is often damaged by needless disassembly and removal of parts.

b. LOCATING TROUBLE.—Before the receiver unit or remote control unit are removed from the aircraft the trouble should be determined if possible. The checks in the following trouble locating chart and block diagram should be made to locate any trouble which can be repaired without removing the equipment. If the trouble cannot be located and repaired by the following checks, the receiver unit and the remote control unit must be removed from the aircraft and taken to a repair station.

(1) INSTALLED EQUIPMENT TROUBLE LOCATING CHART.

Symptoms	Possible Cause of Trouble
Autotune mechanism does not operate and dynamotor does not rotate.	1. No input voltage. 2. Power source voltage too low.
No signal received.	1. Antenna open or short circuit. 2. Defective headphones. 3. Improper tuning.
Receiver inoperative on one or more channels.	1. Improper tuning or a control or controls unlocked.
Receiver operative but remote station inoperative.	1. Defective headphones, cable, plugs, wiring or switch at the remote unit.

(2) INSTALLED EQUIPMENT TROUBLE LOCATING BLOCK DIAGRAM.



(3) REMOVING RECEIVER UNIT FROM THE MOUNTING BASE.

(a) Remove the safety wire and loosen the nuts that clamp the unit to the shock mounting base.

(b) Using the handles on the front panel, pull the unit straight forward to release the unit from the plug-in connection and rear mounting studs.

(3A) REMOVING RADIO SET CONTROL C-733/ARR-15A FROM THE AIRCRAFT.

(a) Loosen the 4 Dzus fasteners by turning each of them one-half turn counterclockwise.

(b) Pull unit straight out.

(c) Disconnect the plug from its mating connector on the rear of the unit.

4. TROUBLE LOCATING AT REPAIR STATION — RECEIVER.

a. PRELIMINARY CHECKS. — The following preliminary checks may be easily performed to locate trouble in the receiver. The checks consist primarily of visual inspections of control positions and equipment performance.

(1) EQUIPMENT REQUIRED.

(a) Power supply—26.5 volts dc.
(b) Power supply cable and plug.
(c) Voltmeter.
Range: 0-10, 0-250 volts dc.
(d) Ohmmeter.
Range: 0-10, 0-100,000, 0-5 megohms.
(e) Spare tubes.

(2) REMOVING CHASSIS FROM CABINET. — When the receiver has been removed from the shock mounting base, proceed as follows to remove the chassis from the cabinet.

(a) Rotate the Dzus fastener, located on the rear of the cabinet, a half revolution counterclockwise.

(b) Using the two handles on the front panel, pull the chassis from the cabinet.

(3) PRELIMINARY TROUBLE LOCATING CHART.

Symptoms	Possible Source of Trouble
Equipment dead.	1. Defective ON-OFF switch. 2. Defective primary power control relay K-101. 3. Broken connection in primary circuit.
Autotune operative but dynamotor does not run.	1. Defective motor brushes. 2. Dynamotor windings open. 3. Open circuits in wiring.
Receiver operative but will not change channels electrically.	1. Defective relay K-103. 2. Defective CHANNEL selector switch. 3. Autotune motor brushes are not making proper contact. 4. Autotune motor winding open.
No signals received.	1. Defective tubes. 2. Defective relays. 3. No plate voltage. 4. Defective circuits.
No plate voltage.	1. Defective dynamotor. 2. Shorted filter or bypass capacitor. 3. Open filter choke. 4. Defective relay.
Receiver noisy.	1. Defective tube. 2. Loose wiring connection. 3. Open filter or bypass capacitor. 4. Defective relay contacts.
Oscillation in receiver.	1. Open bypass capacitor. 2. Defective ground connection. 3. Defective tube. 4. Defective shielding.
Signals weak.	1. Weak tubes. 2. Low voltages. 3. Improper tuning. 4. Misalignment of circuits.

b. TROUBLE LOCATING STAGE BY STAGE.

(1) TEST EQUIPMENT REQUIRED.

(*a*) Audio Signal Generator—TS-382-A/U or Hewlett-Packard 200-C,205-AG.

(*b*) Signal Generator—TS-413/U,-LP,-5 or equivalent.
Range: 400 kc to 20 mc. (LP-5 Signal Generator recommended.)

(*c*) Capacitor—.01 mf (approximate).

(2) PROCEDURE. — The installed equipment trouble locating block diagram shows the procedure recommended for the checking for trouble in the receiver. With the receiver trouble symptom in mind, study the block diagram and considerable time may be saved in locating the trouble.

(*a*) ISOLATING THE TROUBLE.—When the trouble cannot be located in the preliminary checks under Paragraph 4 page 5-4, the stage by stage procedure in the following paragraphs will locate the stage in which the trouble exists.

1. AUDIO STAGES.

a. Connect the output of an audio oscillator through a .01 mf capacitor to the plate of the second audio amplifier tube (Terminal 3 on X-108).

b. Connect the audio oscillator ground lead to chassis ground.

c. Adjust the audio oscillator to approximately 1000 cps, with maximum output.

d. Adjust the VOLUME control to maximum position.

e. Operate the CW MCW-CAL switch to MCW-CAL position.

f. Turn the audio oscillator and receiver on. The 1000 cps signal should be heard in the headphones if the circuits are operative (allow enough time for the tubes to reach the operating temperature).

g. Using the procedure in the above steps, connect the audio oscillator output lead to the following check points and in the following sequence:

(*1*) Grid of second audio tube, (Terminal 5 on socket X-108).

(*2*) Plate of audio driver tube, (Terminal 8 on socket X-107).

(*3*) Grid of audio driver tube, (Terminal 4 on socket X-107).

(*4*) Cathode and plate of noise limiter tube, (Terminals 4 and 5 on socket X-110).

Note

If a stage is defective the trouble will be between the point where no signal was heard and the last point at which the signal was heard.

2. DETECTOR, AVC AMPLIFIER AND NOISE LIMITER.—If the signal is heard in the headphones when the output of the audio oscillator is fed to the cathode and plate of the noise limiter tube, it is evident that the audio stages are operative and that the trouble must be in a stage preceding this point. These stages may be checked in much the same manner as the audio stages were checked. Use a signal generator in place of the audio oscillator and proceed as follows:

a. Connect the output lead of the signal generator through a .01 mf capacitor to the i-f coil side of the crystal detector CR-101 in the AN/ARR-15, or to pin 5 of V-105 in the AN/ARR-15A.

b. Connect the ground lead of the signal generator to the chassis ground.

c. Adjust the receiver VOLUME control to the maximum position.

d. Turn on the receiver and signal generator.

e. Make certain the CALIBRATE dial is in the 0 position.

f. Adjust the signal generator to 500 kc and the signal will be heard if the circuits are operative.

3. IF AMPLIFIER STAGES.—Using the same procedure as in the above steps b., c., d., e., and f., connect the output from the signal generator to the following check points in the following sequence:

a. Plate of tube V-104 (Terminal 8 on socket X-104).

b. Grid of tube V-104 (Terminal 4 on socket X-104).

c. Plate of tube V-103 (Terminal 8 on socket X-103).

d. Grid of tube V-103 (Terminal 4 on socket X-103).

e. Plate of tube V-102 (Terminal 8 on socket X-102).

f. Grid of tube V-102 (Terminal 4 on socket X-102).

4. OSCILLATOR, FREQUENCY MULTIPLIER AND MIXER STAGES.—If the signal of the signal generator is heard through the i-f amplifier stages, the oscillator, frequency multiplier and mixer stages may be checked by leaving the signal generator connected to the grid of the mixer tube as in the above paragraph under step f. and adjusting the signal generator and the receiver TUNING dial to a like frequency. The signal will be heard if these stages are operative.

CAUTION

Do not even attempt to loosen a screw in the high or low frequency oscillator units before carefully reading the instructions under paragraph 4., *d.* page 5-6 in this section.

5. RF AMPLIFIER STAGE.—If a signal is heard when the stages in the above paragraph are checked, the r-f amplifier stage may be checked

with the same receiver and signal generator adjustment. Proceed as follows:

a. Connect the output of the signal generator to the plate of the r-f amplifier tube, V-101 (Terminal number 8 on socket X-101).

b. Grid of the r-f amplifier tube, V-101 (Terminal number 4 on socket X-101).

c. Antenna connection on the front panel.

6. LOW FREQUENCY OSCILLATOR. — If the receiver operates normally when the CW MCW-CAL switch is in the MCW-CAL position but there is no beat frequency when the switch is in the CW position or if no zero beat can be obtained between the 100 kc check points from the cfi oscillator when the CALIBRATE dial is rotated, the low frequency oscillator unit or circuits are inoperative. (See CAUTION under above Paragraph 4.)

7. CFI UNIT. — If the receiver operates normally but no 100 kc check points can be heard when the cfi unit is turned on by the CALIBRATE dial, the cfi unit or circuits are inoperative.

c. TROUBLE LOCATING IN A STAGE FOUND INOPERATIVE.—When trouble is known to exist in the high or low frequency oscillator units, refer to Paragraph 4., *d.* on this page 5-6 for the procedure to be followed in replacing oscillator. When trouble is known to exist in any other stage or circuit, use the following procedure to locate the trouble:

(1) Replace the tube with one of the same type that is known to be in good condition and check to see if the trouble is corrected.

(2) Measure the voltage at the tube sockets. Incorrect voltage readings will indicate defective wiring or components.

(3) Check the capacitors for an open or shorted condition. A shorted capacitor usually will cause improper voltages to exist and may also cause resistors and other components to heat excessively. An open capacitor may be located by shunting the capacitor that is suspected with a test capacitor of the same value. An open capacitor will cause noise, oscillation or no signal to be heard.

(4) With the receiver turned off, measure the resistance of both the fixed and variable resistors in the circuit.

(5) With an ohmmeter and a schematic drawing of the circuit, check the continuity of the wiring, coils, transformers, relay contacts and relay coils.

(6) Replace any components found defective in the above checks and operate the receiver to determine if the trouble is corrected.

d. HIGH OR LOW FREQUENCY OSCILLATOR.

CAUTION

Do not attempt to disassemble any part of the high or low frequency oscillators until the trouble is definitely proven to exist within the sealed cover. Each oscillator unit was accurately calibrated when installed at the factory and if a unit is loosened or removed from the equipment the calibration will be destroyed.

(1) OPERATIONAL CHECK.

(a) EQUIPMENT REQUIRED. — Receiver containing a beat frequency oscillator and having a frequency range of 450 to 550 kc to 2000 to 3000 kc.

Note

Any frequency measuring instrument may be used to determine if the oscillator unit is operative.

(b) PROCEDURE. — The oscillator unit should be checked while still in the receiver before disassembling any part of the unit. To check the unit proceed as follows:

1. Measure the plate and heater voltage at the connector jack to make cetrain the voltages are correct.

2. Unsolder and remove the wire from terminal number 4 on the connector jack.

3. Solder a short piece of insulated wire to the above terminal.

4. Connect an insulated wire to the antenna terminal of the test receiver.

5. Twist the insulated wire from the receiver around the wire that is soldered to the oscillator unit connector jack but do not make a connection to the wire.

6. Turn the receiver and test receiver on.

7. Operate the MCW-CW switch to the MCW position for checking the high frequency oscillator; check the low frequency oscillator with the CALIBRATE dial turned on.

8. Tune the test receiver from 450 to 550 kc for checking the low frequency oscillator unit or 2000 to 3000 kc for the high frequency oscillator unit. If no signal can be heard, the oscillator unit is defective.

(c) REPLACEMENT OF TUBE.

1. Remove the four seal headed screws which hold the tube cover to the unit and lift the tube cover off.

CAUTION

Hold the oscillator unit to remove strain when the tube is pulled out and a tube is being inserted.

2. Insert a tube of the proper type that is known to be in good condition.

3. Before replacing the tube cover, turn the receiver on to ascertain if the trouble is corrected.

4. If the trouble is corrected, replace the

tube cover. Use new rubber gaskets for the screws and tube cover.

5. Check the oscillator unit frequency for changes caused by the tube now in use.

(d) REPLACEMENT OF HIGH FREQUENCY OSCILLATOR UNIT.

1. Set the TUNING control at 3.5 mc and the BAND switch "B".

2. Remove the front panel of the receiver.

3. Remove the dial from the Autotune head in front of the oscillator unit.

4. Remove the Autotune head.

CAUTION

Do not move the line shaft or the gears in the Autotune head just removed.

5. Disconnect and remove the cfi unit from the receiver. The cfi unit is bolted to the main chassis by four captive screws which are observed from the bottom of the receiver.

6. Loosen the Bristo set screws in the collar connecting the oscillator tuning shaft.

7. Unscrew the screws which hold the oscillator unit to the Autotune casting and remove the defective oscillator through the space made by the removal of the cfi unit.

8. Install the new oscillator unit in the receiver using the screws that were removed from the front plate of the defective unit.

9. Replace the cfi unit and restore the connections.

10. Reassemble the Autotune head, dial and front panel but do not tighten the Bristo screws in the collar which fastens to the oscillator unit shaft. (The dial must be set at 3.5 mc band "B" before reassembling).

CAUTION

Do not operate the Autotune mechanism until all of the following adjustments have been made with manual tuning.

11. Unlock both Autotune controls.

12. Operate the CALIBRATE dial to the "0" position.

13. Short or block the calibrate switch to allow the l-f oscillator and the cfi unit to operate.

14. Tune the test receiver to 3.0 mc on band "B".

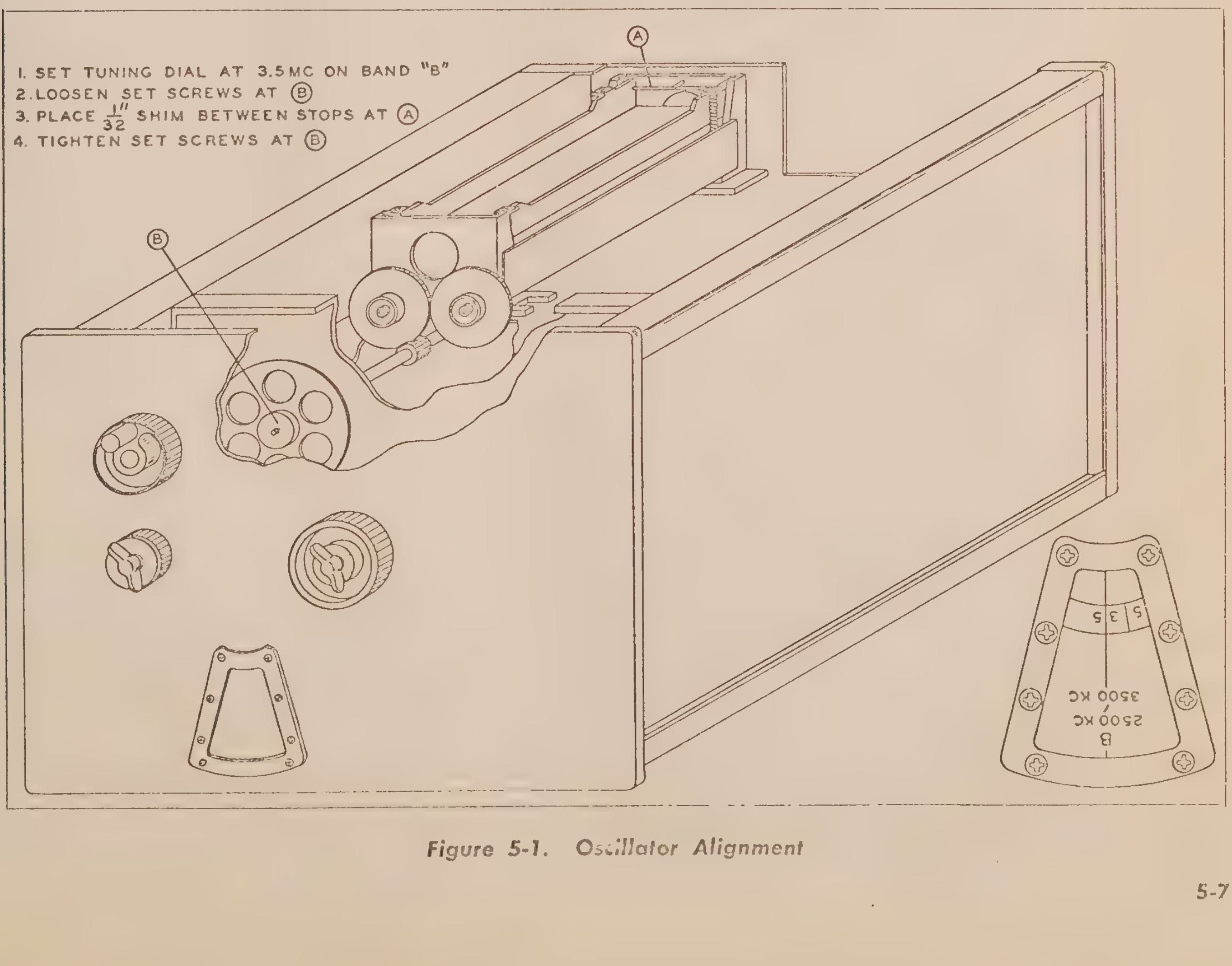


Figure 5-1. Oscillator Alignment

15. Couple the test receiver to terminal number 4 on the high frequency oscillator and tune the oscillator until a beat note is heard in the test receiver. The oscillator must be turned by grasping the oscillator shaft with a thin pliers.

16. While listening to the output of the R105/ARR-15 receiver, tune the high frequency oscillator to zero beat with the CFI signal which should be heard at three and one-half mc.

17. Turn the TUNING dial to 3.5 mc and lock the set screws in the coupling collar on the oscillator shaft. (The incoming signal is five-tenths mc higher in frequency on this band therefore the dial would be set at 3.5 mc when the oscillator is at 3.0 mc).

18. With the tuning dial set at 3.5 mc there should be approximately 1/32 inch clearance between the fixed stop and the movable stop on the tuning coil platform, see Item A figure 5-1. If this clearance is not 1/32 inch, the set screws in the large gear, Item (B) figure 5-1 on the front end of the tuning shaft should be loosened and the clearance between the stops adjusted by inserting a 1/32 inch shim between the stops after which the set screws should be tightened and the shim removed.

19. Before the Autotune mechanism is operated, tune manually from one end of the dial to the other to make certain the oscillator unit is properly adjusted. If not properly adjusted, the tuning slug in the oscillator will hit the tuning slug end stops and the Autotune gears may become stripped or the equipment damaged. Do not attempt to "force" the tuning mechanism.

20. It may be necessary to re-align the r-f and the band pass stages for maximum results. (See paragraph 8. *d.* page 5-18 for alignment procedure.)

21. Check and reset the Autotune controls for all of the channels.

(e). REPAIRING OSCILLATOR UNITS.

CAUTION

Do not attempt to disassemble and/or repair either the high or low frequency oscillator unit unless complete alignment equipment, as outlined in paragraph 4, *d. (f)* in this section, is available and the alignment procedure is thoroughly understood.

1. Remove the unit from the receiver as outlined in paragraph *(d).*

2. Remove the eight seal headed screws which fasten the tube cover and connector plug to the unit cover.

3. Remove the tube cover and pull the tube and plug from the unit.

4. Remove the three seal headed screws on the rounded end of the unit which fasten the unit cover to the front plate. Remove the unit cover.

5. Check all the components and replace any that are found defective.

Figure 5-2. Disassembly View of HF Oscillator

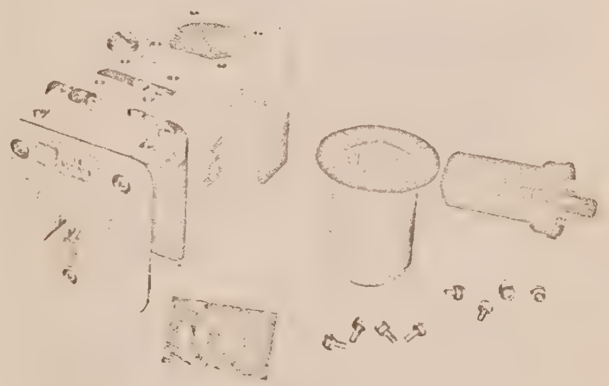


Figure 5-3. Disassembly View of LF Oscillator

a. REPLACING COMPONENTS. — To replace the grid inductor, tuning slug, lead screw or rotary seal, the unit must be further disassembled.

(1) Remove the three seal headed screws from the countersunk holes in the front plate.

(2) Remove the front plate, lead screw and tuning slug with care to avoid losing the end thrust ball bearing.

(3) Unsolder the wires from the grid inductor and remove the three screws which hold the grid inductor to the end plate.

(4) To replace the rotary seal, loosen the two Bristo set screws in the rotary seal collar and pull this section of the rotary seal off the threaded end of the lead screw, after the tuning slug has been removed. The other section of the rotary seal is pressed into a seat on the front plate and may be pried out.

(5) When the grid inductor is replaced, leave the three screws slightly loose.

(6) If the lead screw or the rotary seal is replaced, press the rotary seal onto the lead screw but do not tighten the Bristo set screws into the collar.

(7) Press the remaining section of the rotary seal into the countersunk seat on the front plate.

(8) Grease the lead screw and screw into the tuning slug.

(9) Place a small portion of grease on the thrust end of the lead screw and the ball bearing before inserting the tuning slug into the tuning inductor.

(10) Loosen the lock nut on the front bearing and unscrew the bearing a few revolutions.

(11) Grease the bearing slightly and replace the end plate.

(12) Replace the rubber gaskets on the three screws and tighten the screws firmly.

(13) Space the grid inductor evenly around the tuning slug and tighten the screws into the grid inductor base.

(14) Solder the wires that were disconnected in step *(3)* above, into place.

(15) Adjust the front bearing and tighten the lock nuts. Repeat this procedure until no end play can be felt and the lead screw runs smoothly and does not bind at any position of the tuning slug.

(16) Adjust the rotary seal collar, by sliding the collar until the spring is compressed to one-quarter of the extension and tighten the two Bristo set screws into the rotary seal collar.

(17) Assemble the cover, plug, tube and tube cover, using new rubber gaskets on both the covers and screws. The unit must now be aligned and tested.

(f) OSCILLATOR ALIGNMENT. — The alignment of the high and low frequency oscillator units is important for proper operation of the receiver. An oscillator must be aligned after being disassembled.

1. EQUIPMENT REQUIRED.

a. Navy LM Series instrument.

b. Oven - refrigerator.

Temperature range: Adjustable from —40°C (—40°F) to +70°C (+158°F).

2. PROCEDURE.

a. Connect a 12 volt supply to terminals 1 and 2 of the connector plug.

b. Connect the positive voltage of a 250 volt supply to terminal number 3 and the negative voltage to terminal number 2 of the connector plug.

c. Connect the frequency measuring instrument to terminal number 4 of the connector plug.

d. Attach an indicator knob and dial to the oscillator lead screw shaft.

e. Adjust the frequency measuring instrument for 450 kc for the low frequency oscillator (2000 kc for the high frequency oscillator) and rotate the oscillator dial to this frequency.

f. Note the dial setting and rotate the oscillator unit dial exactly five revolutions for the low frequency oscillator. The frequency should measure exactly 550 kc. (The high frequency oscillator unit output should measure exactly 3000 kc after the dial has been rotated exactly 10 revolutions).

g. If the frequency measures higher or lower, remove the cap screw that is located between the plug and the tube, on top of the unit and adjust the variable capacitor to compensate for the error.

h. Repeat steps e., f., and g. until the exact number of revolutions of the dial will cover the oscillator frequency range.

i. Remove the tube cover and place the unit in an oven that is at a temperature of +70°C (158°F) for several hours to dehydrate and age the components within the oscillator unit.

j. Replace the tube cover and cap screw to seal the unit.

k. Repeat the above steps a. to h. to check any variation which may have occurred.

l. Connect the oscillator unit as in the above steps a., b., and c. and place the unit in the oven-refrigerator. (The unit must be sealed.)

m. Run frequency and temperature charts at the high and low frequency end of the oscillator frequency range while slowly changing the temperature from —40°C (—40°F) to +70°C (+158°F).

n. If the frequency drifts more than plus or minus one kc, compensate for the drift by replacing the temperature compensating capacitors, with capacitors of a plus or minus temperature coefficient, whichever is required to correct the drift.

o. When a change is made, repeat the above steps l. to n. When the performance is satisfactory the unit may be installed in the receiver.

p. Install the hf oscillator in the receiver using instructions outlined in paragraph *d.*(1)*(d)* REPLACEMENT OF HIGH FREQUENCY OSCILLATOR UNIT.

4A. TROUBLE LOCATING AT THE REPAIR STATION — RADIO SET CONTROL C-733/ARR-15A.

a. EQUIPMENT REQUIRED.

(1) Ohmmeter
Range: 0-10

b. REMOVING THE DUST COVER.

(1) Loosen the 2 Dzus fasteners on the rear of the dust cover.

(2) Pull dust cover off.

c. PRELIMINARY TROUBLE LOCATING CHART.

Symptoms	Possible Source of Trouble
AUTOTUNE will not operate when CHANNEL selector switch is rotated to any position.	1. Defective ON-OFF switch. 2. Defective CHANNEL selector switch. 3. Broken connection.
AUTOTUNE will not operate when CHANNEL selector switch is in a specific position.	1. Defective CHANNEL selector switch. 2. Broken connection in CHANNEL selector circuit.
AUTOTUNE operates continuously when controlled from remote unit.	1. Defective CHANNEL selector switch. 2. Two or more control leads shorted together. 3. Grounded control lead.

d. TROUBLE LOCATING.—Using an ohmmeter, and with figure 8-14 as a reference, check the switches and wiring for continuity. Check for shorts between terminals of J-1001. Replace defective parts.

5. REPLACEMENT OF DIAL LAMPS.

a. RECEIVER.

Each of the two dial windows on the front panel is illuminated by a twenty eight volt dial lamp. The two lamps are wired in series and are impressed across the 26.5 volt supply. The receiver chassis must be removed from the cabinet to replace the dial lamps. Refer to paragraph 1.*d.* (2), page 5-1, in this section, for the procedure to remove the chassis from the cabinet.

b. RADIO SET CONTROL C-733/ARR-15A.

The plastic panel of this control is illuminated by two 26.5 volt dial lamps. To replace one of these lamps, unscrew the cap that protrudes from the panel, and pry the lamp from its position in the bottom of the cap. Replace with new lamp and screw the cap into its receptacle.

6. SPECIAL MAINTENANCE.

a. MECHANICAL ADJUSTMENT AND REPAIR.

(1) AUTOTUNE SYNCHRONIZATION.—The synchronization of an Autotune system involves the adjustment of the relative angular positions of the cam drums and the seeking switch. This adjustment insures that the channel chosen by the switch will always be selected properly. The synchronizing adjustment is accomplished by the following procedure.

(a) CONTROL UNIT.

1. Remove the control knobs and panel from the receiver.

2. Remove the necessary pieces of apparatus so that the front of the Autotune units are accessible. It will not be necessary to operate the unit under power to perform the synchronization nor will it be necessary to uncover the control unit.

3. Insert the synchronizing wrench (use a number 10 Bristo wrench) into the right-hand end of the line shaft.

4. Rotate the shaft counterclockwise until the red flag observed through the hole in the top of the control unit, disappears and reappears with a sudden snap.

5. Stop rotating the line shaft, as near as possible, at the point where the red flag snaps into position under the inspection opening in the control unit.

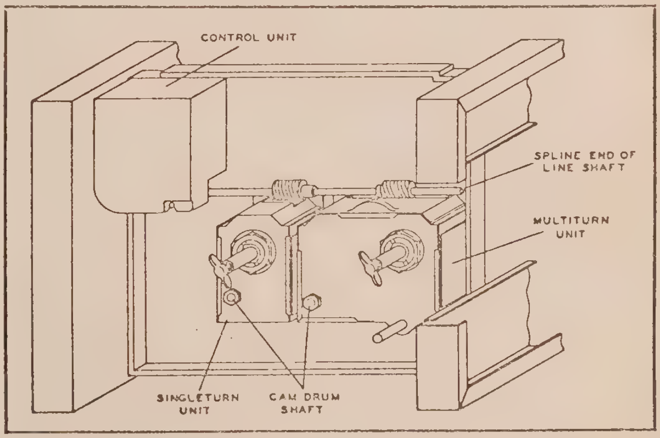


Figure 5-4. Autotune Synchronism Adjustments

6. Rotate the line shaft in the opposite direction six to six and one-fourth revolutions and stop.

(b) MULTITURN UNIT.

7. Insert a number 10 Bristo wrench into the end of the shaft of the cam drum of the multiturn unit. *(Refer to figure 5-4.)*

8. Using the wrench, rotate the cam drum as far as possible in a counterclockwise direction.

9. While holding the cam drum as indicated in step 8., loosen the nut that is located on the end of the cam shaft by rotating the nut in a clockwise direction.

10. Again, using the Bristo wrench, rotate the cam drum as far as possible in a counterclockwise direction. (The pawl must be engaged with the stop ring before making this adjustment.)

11. Tighten the nut. (Rotate in a counterclockwise direction.)

(c) SINGLETURN UNIT.

12. Insert the Bristo wrench into the end of the cam drum. *(Refer to figure 5-4.)*

13. Rotate the cam drum as far as possible in a clockwise direction.

14. Loosen the nut on the end of the cam shaft by rotating the nut in a counterclockwise direction.

15. Rotate the shaft as far as possible in a clockwise direction. (The pawl must be engaged with the stop ring before making this adjustment.)

16. Tighten the nut.

Having completed the above adjustments, the Autotune mechanism will be properly synchronized. To check the synchronization, select an Autotune channel and note the position of the pawls in slots of the cam drums. At room temperature and with normal voltage applied to the motor the pawl should be approximately in the center of the slot on both units. After the synchronization has been checked and the mechanism is found to be operating properly, secure each item that has been loosened with a drop of liquid staking compound.

(2) AUTOTUNE REPAIR.

CAUTION

Do not attempt to repair the Autotune mechanism until all methods of adjustment have been tried and have failed and the following operational checks have been performed.

(a) The following chart will assist in localizing trouble in the Autotune mechanism.

Symptoms	Possible Source of Trouble	Remedy
Autotune system continues to run, recycling instead of reversing.	1. Motor reversing switch S-109 not operating properly. 2. Timing cam switch S-107 not operating properly. 3. Motor does not reverse properly.	1. Clean, readjust or replace switch. 2. Clean and adjust switch. 3. Replace motor.
Erratic operation.	1. Faulty operation of tuning switch cam.	1. Move seeking switch S-106 clockwise until the system begins to operate. The distance moved should be a noticeable amount (about 5 degrees). Readjust star cam.
Intermittent operation.	1. Control unit contacts need cleaning.	1. Burnish the contacts to a smooth glossy surface.
One unit will not position.	1. Check defective unit by rotating locked unit control knob throughout the range of rotation attempting to engage the pawl.	1. If the pawl can be engaged by this means, resynchronization is probably necessary.
Resynchronization does not remedy non-positioning of unit.	1. Foreign matter in unit. 2. Broken, unhooked or weak pawl spring. 3. "Sticky" pawl.	1. Clean unit. 2. Reattach or replace. 3. Can be made to operate in an emergency by working in a few drops of AN-0-4 oil into the pawl stack.

(3) RELAYS.—The relays in this equipment will not require service unless a short circuit has caused the contacts to be burned and pitted or damage has resulted from rough handling or improper treatment of the contacts. When it is necessary to clean and readjust a relay, do it carefully. Handle the relay as you would an expensive watch or fine meter. To clean the flat surface contacts, use only a crocus cloth or burnishing tool. Make certain all burns are removed from the contact points and that the surfaces are parallel. Make the contact adjustments carefully. Do not bend the contact spring arms. If the contacts do not close properly, bend the point tip end of the spring slightly. Check and re-check until the spacing is exactly what it should be. If a relay is badly damaged, replace the relay.

(4) SWITCH MAINTENANCE.—Maintenance of switches in this equipment primarily involves adjusting and cleaning. The adjustment and cleaning of the switches should follow the same procedure and use of the same materials as recommended for relays, paragraph 6, (3), on this page, 5-11.

b. AUTOTUNE LUBRICATION. — Under ordinary operating conditions the Autotune mechanism will not require any lubrication for the lifetime of the equipment. If, however, the equipment is operated in a hot arid climate it may be necessary to lubricate the oilite bearings, replenish the oil supply of the oil retainers, and insert new worm gear lubricators into the holders once a year. The lubricants recommended are shown on the following lubrication chart:

LUBRICATION CHART

ASSEMBLY	PART	LUBRICANT						LUBRICATION PERIOD	PROCEDURE
		CODE	MFR. AND MFR'S TYPE	SPECIFICATIONS					
				ANA	ARMY	NAVY	BRITISH		
Autotune Casting	Oilite Bearings	A	Standard Oil Co. of N.J. BE-19584	AN-0-4			DTD 561	Annually	Apply only amount bearing will retain.
Autotune Unit	Pawl Stacks	A	Standard Oil Co. of N.J. BE-19584	AN-0-4				Annually	Apply sparingly with camel hair brush. Remove excess lubricant.
Autotune Unit	Felt Washers	A	Standard Oil Co. of N.J. BE-19584	AN-0-4			DTD 561	Annually	Apply only amount bearing will retain.
Autotune Unit	Spur Gears	D	DOW Corning #7					Annually	Apply sparingly with camel hair brush, remove excess lubricant.
Autotune Casting	Worm felt wick lubricator		Cities Service 7249M					Annually	Replace with new impregnated wicks.
Autotune Casting	Worms, line shaft gear box, thrust bearing	C	Cities Service PD-535A	AN-G-3			DTD 577	Annually	Apply sparingly with camel hair brush, remove excess lubricant.
Slug Platform Drive	Gear Box	B	Cities Service 51A	*				Annually	Repack if necessary.

*AN-G-3 may be used for lubricant B (Cities Service 51A) if extremely low temperature operation is not required.

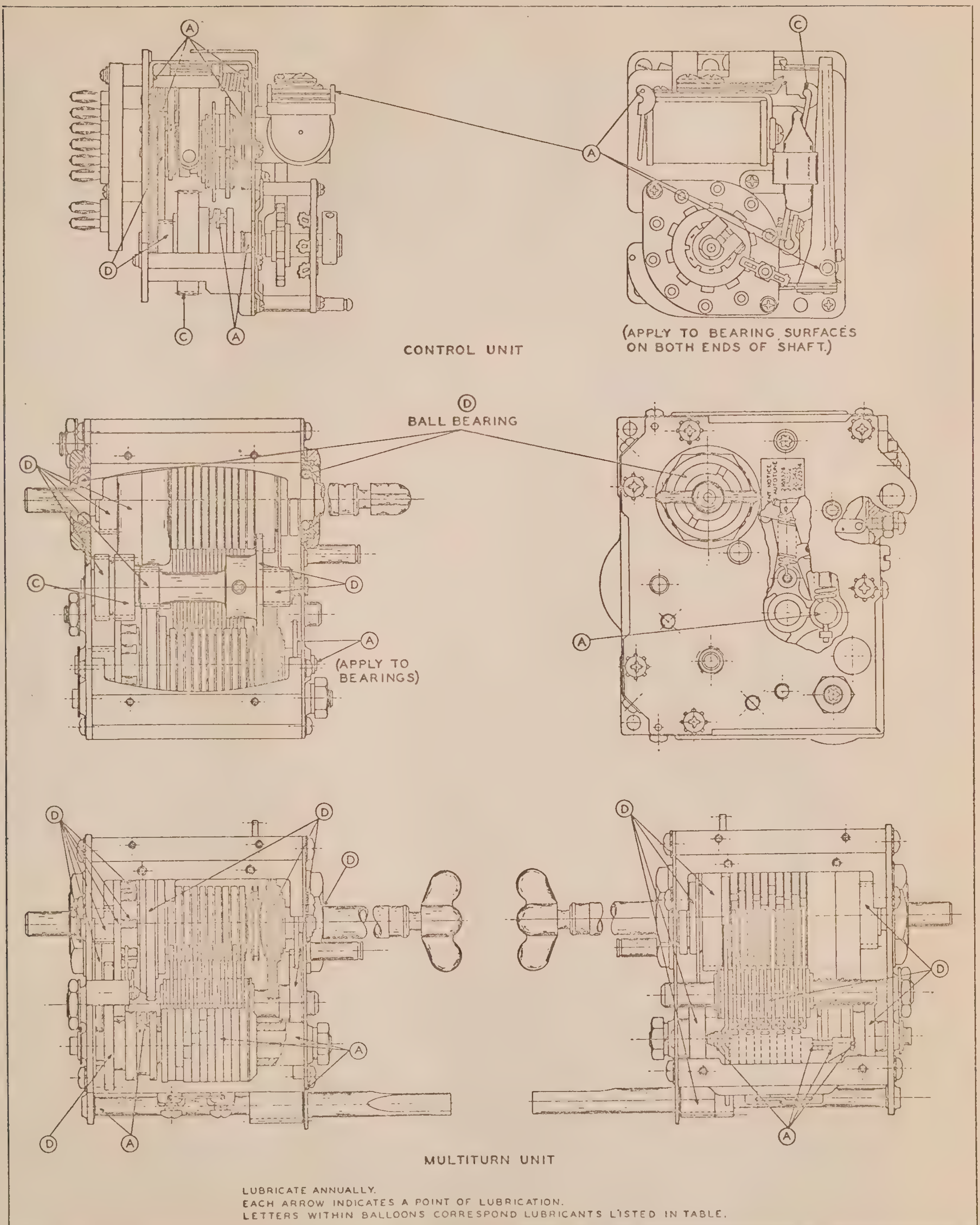


Figure 5-5. Lubrication Chart (Page one of two pages)

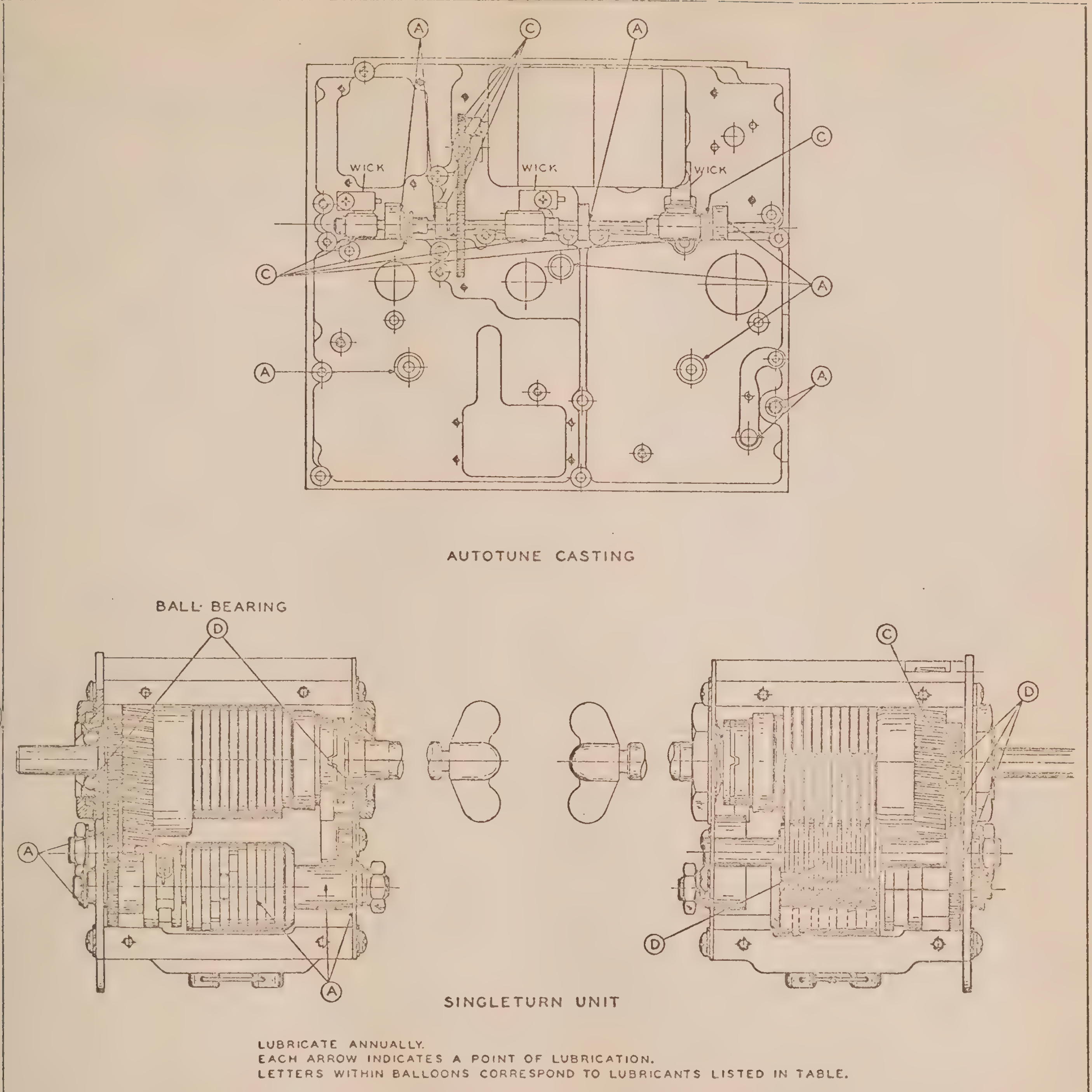


Figure 5-5. Lubrication Chart (Page two of two pages)

7. DYNAMOTOR MAINTENANCE.

a. BRUSHES.—Replace brushes when less than one-fourth inch long, measured to the spring. The brush pressure is considered satisfactory if one-fourth inch or more of the spring extends out of the brush holder when the screw cap is removed and the brush is touching the commutator. New brushes may be sanded in with a strip of 4/0 sandpaper slipped under the brush and pulled back and forth over a suitable arc of the commutator. It is preferable that new brushes be run in for several hours at no load, or a light load, to obtain the proper fit before the machine is required to carry the full load. When brushes are removed for any reason, replace each brush in the same holder with the polarity marks face upward. If a brush pigtail is broken or loose in the brush or end cap, the current will have a tendency to go through the brush spring. This condition will cause the spring to over-heat, lose temper and fail to give the proper brush pressure.

b. ARMATURE.—The armature should be removed as follows:

(1) Remove the covers from both ends of the dynamotor.

(2) Remove the brush holder caps and brushes from both the high and the low voltage ends of the commutator.

CAUTION

Notice that each brush is marked so that the brush may be replaced in the same holder and in the same position in the holder.

(3) Blow the dust and dirt from the shield and windings and disconnect the leads from the field coils to the brush holder on the high voltage end at the brush holder terminals.

(4) Remove the nuts from the clamp bolts and remove the end shield.

(5) Carefully remove the armature so as not to lose the end spacers.

c. COMMUTATOR.—A highly polished commutator is very desirable. A dark colored commutator should not be mistaken for a burned commutator. If the surface is smooth and polished and the commutation is satisfactory, the commutator should not be resurfaced. Slight sparking is not necessarily evidence of poor commutation. If the surface of a commutator is dirty, use a clean cloth moistened with a cleaning fluid, such as petroleum spirits, kerosene, or gasoline for cleaning and then rewipe with a dry cloth. Keep the bearings and housing clean. Remove the end covers and blow the dust and dirt out after each 300 hours of operation. This cleaning should also include removing the brushes and wiping the inside of the brush holders and the external surface of the brushes. If any mica of the undercut commutator extends up to the commutating surface, the mica should be undercut. For turning down the commutator or for extensive undercutting, remove the armature from the dynamotor and place in a lathe.

d. BEARINGS AND LUBRICATION. — The bearings are designed for long life but should be replaced if the bearings are loose on the shaft or if not otherwise operating satisfactorily. If the dynamotor is overhauled after each 300 hours of operation, no lubrication will be required between overhauls. To lubricate the bearings, remove the end cover and blow out the dust and dirt. Remove the screws that hold the end shield bearing retainer. Remove the retainer, being careful not to lose any washers from the end of the shaft. Clean out all the old grease. Apply three or four drops of light machine oil to the balls and repack the outer side of the bearings with a small amount of grease. Keep dirt from entering the housing and do not allow grease or oil to drop onto the commutator. Replace the washers and the end shield bearing retainer and cover. If the bearings are to be replaced, it will be necessary to remove the armature. If a puller is not available to remove the bearings, clamp the outer race firmly in a vice and drive the bearing off the shaft by holding a punch against the end of the shaft and tapping the punch lightly with a hammer. Shiming should be done using washers equally divided at both ends. End play of approximately .015 inch maximum is permissible. Whenever a bearing is removed from the housing, wipe the housing with a clean cloth and lubricate the housing sparingly with light machine oil. The inner race fits the shaft with a light press fit and some selection of bearings may be necessary to find one that is not too loose. The outer race should have a sliding fit in the housing. A small piece of pipe with the end smooth and slightly larger than the shaft is useful to press a new inner race onto the shaft. Do not exert pressure on the outer race of a bearing that is being pressed onto the shaft. After replacing a bearing, reassemble the dynamotor and make certain that the armature revolves readily without binding.

e. TROUBLES. — The following chart lists the troubles most often encountered in the operation of a dynamotor and the causes and correction of each:

Symptoms	Possible Cause of Trouble	Remedy
Dynamotor stops or fails to start.	1. Open or loose connections. 2. Shorted capacitor. 3. Brushes not seating properly due to a dirty, sticky or worn condition. 4. Poor commutation due to dirty, oily or rough commutator or high mica. 5. Worn bearings causing armature to strike pole faces or connections. 6. Defective armature.	1. Tighten connections. 2. Replace capacitor. 3. Remove brushes from holders and clean thoroughly. Seat brushes with 4/0 sandpaper, replace worn brushes. 4. Clean commutator and brushes. If commutator is rough, turn down commutator and undercut mica. 5. Replace bearings. 6. Replace defective armature.
Excessive arcing at the brushes.	1. Poor commutation due to dirty, oily or rough commutator. 2. Brushes not seating properly due to a dirty, sticky, or worn condition or a twisted pigtail. 3. Brush spring weak or defective. 4. Short between commutator bars. 5. Open in armature coil.	1. Clean commutator and brushes. If commutator is rough, turn down with a lathe and undercut mica. 2. Clean brushes, untwist pigtail connector or replace brush assembly. 3. Replace brush assembly. 4. Clean slots or replace armature. 5. Replace armature.
Rapid wearing of brushes.	1. High mica causing excessive arcing. 2. Dirty commutator.	1. Turn down commutator on a lathe and undercut mica. 2. Clean commutator and brushes.
Electrical noise in receiver.	1. Sparking at commutator resulting from shorted or open capacitor or connection.	1. Replace capacitor. Tighten connections.
Mechanical noise and vibration.	1. Armature striking internal wiring. 2. Armature. 3. Worn Bearings.	1. Rearrange internal wiring. 2. Replace bearings. 3. Replace bearings.

f. ARMATURE WINDING TEST.—Overheating, reduced speed, excessive arcing at the brushes or low output voltage indicates that an armature winding may be shorted. When one or more of the above conditions exists, measure the resistance between pairs of adjacent commutator bars, particularly on the high voltage end of the commutator. A reading between one pair of bars which is more than seven per cent higher or lower than the average of readings between other pairs of bars indicates an open or shorted winding.

8. RECEIVER ALIGNMENT.

a. GENERAL.—The following equipment is required to align the receiver r-f and i-f circuits: A signal generator covering the range 450 to 550 kc and 1500 to 18,500 kc, an adjustable range audio output meter suitably matched to the receiver output impedance of 300 ohms, and a non-metallic screwdriver alignment tool.

b. I-F CIRCUIT ALIGNMENT PROCEDURE.—The i-f channel should be aligned first. Proper alignment will be secured by the following procedure:

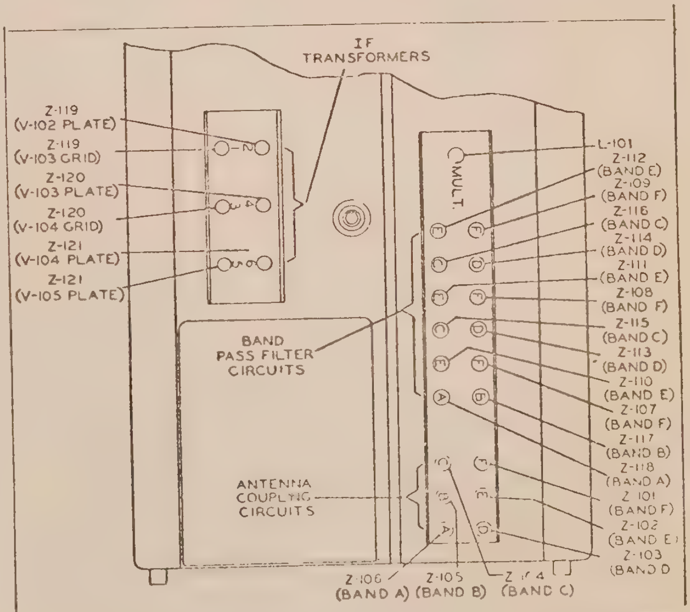


Figure 5-6. Tuned Circuit Locating Diagram, IF and Band Pass Adjustments

(1) Adjust the receiver for MCW operation.

(2) Connect the output lead of the signal generator to the control grid of mixer tube V-102 (pin No. 4 of X-102). Connect the grounded lead to any convenient receiver chassis point.

(3) Connect the output meter to output jack J-111 and adjust the meter for the lowest range.

(4) Remove frequency multiplier tube V-109 from the receiver.

(5) Adjust the signal generator for exactly 500 kc, minimum signal output, 1000 cycle modulation on.

(6) Turn on the receiver and allow the unit to "warm up" for at least five minutes.

(7) Advance the signal generator attenuation control until a deflection is obtained on the output meter.

(8) Increase the signal generator output and increase the output meter range until a point is found where a further increase in signal generator signal does not cause a corresponding increase in output meter reading. Attenuate the signal generator until a drop of several db is observed in the output meter reading. This output meter reading must not be exceeded during receiver alignment since it indicates a safe margin below the avc threshold level.

(9) Since the first two i-f transformers are overcoupled, a special alignment probe containing a 10,000 ohm resistor is provided to be used in aligning these transformers. The probe will be found clipped to the chassis in the left side of the receiver. Refer to Figure 6-8.

(10) Insert connector on probe in the jack engraved "probe" located on the mounting board of C-125.

(11) Refer to Figure 6-7. The left side of the receiver will be found to have a shield containing three holes numbered 2-3-4 located over the pins of V-103 and V-104, sockets X-103 and X-104.

(12) Contact the terminal on Z-119, to which the coaxial cable is attached, with the probe and adjust i-f slug numbered "1" on the i-f platform for maximum output. Through the hole in the shield numbered "2" contact the transformer terminal with the probe and adjust i-f slugs numbered "2" on the i-f platform (see figures 5-6, 6-3 and 6-4) for maximum output meter readings. Repeat procedure for transformer terminals 2-3-4 and slugs 3-4.

CAUTION

Care must be exercised to constantly attenuate the signal generator during alignment procedure so that the output meter reading does not rise above the level determined in step (8). Failure to do this may result in misalignment of the i-f circuits.

(13) Repeat the adjustment of i-f slugs 1-2-3-4 in the same manner as outlined to correct for any interaction between the circuits.

(14) Rock the frequency control of the signal generator back and forth slowly to locate the "humps" that will be present in the i-f response curve obtained by the preceding tuning procedure. Record the frequency of these "humps" and the output level obtained on each.

(15) Adjust i-f slugs 5 and 6 for maximum output in such a manner as to favor the "humps" found in step (14) to obtain an equal response on each. The object is to obtain the maximum response possible while still maintaining the i-f band width obtained by the procedure for tuning i-f slugs 1-2-3-4.

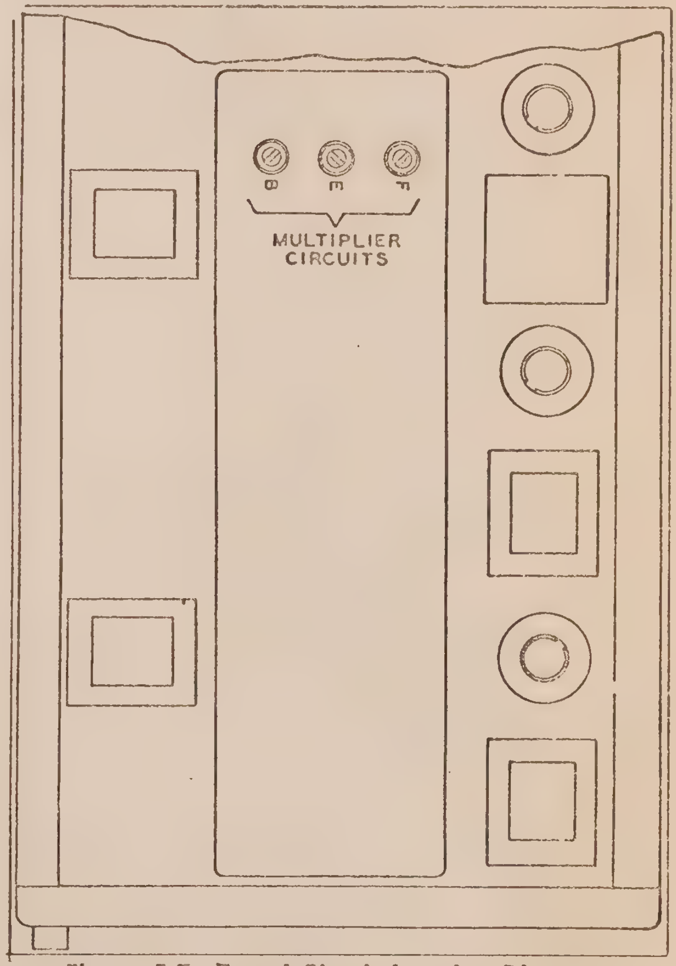


Figure 5-7. Tuned Circuit Locating Diagram, Multiplier Adjustments

c. MULTIPLIER ALIGNMENT.—The multiplier is aligned by means of the slug adjustment of L-101 and the adjustment of C-141, C-142, and C-143. The slug adjustment for L-101 is engraved MULT. and can be located by referring to figures 5-6, 6-3, and 6-4. Variable trimmer capacitors C-141, C-142 and C-143 are located on the right side of the receiver and the slotted shaft screwdriver adjustments are accessible through the holes in the shield engraved F, E and B. Refer to figures 5-7, and 6-6. To align the multiplier, proceed as follows:

(1) Connect the output lead of the signal generator to the antenna terminal of the receiver and

connect the grounded lead to any convenient receiver chassis point.

(2) Connect the output meter to output jack J-111, adjust the receiver for MCW operation, turn the receiver on and allow the unit to "warm up" for at least five minutes.

(3) Loosen the Autotune locking keys and set the BAND selector control for the 12.5 to 18.5 megacycle band (band F).

(4) Rotate the TUNING control to the stop on the high frequency end of the band, then back away from the stop from two or three turns of the TUNING control.

(5) Adjust the signal generator to the frequency arrived at on the receiver. Adjust both the signal generator and the output meter to find the avc threshold level as outlined in steps (7) and (8) under i-f alignment procedure.

(6) Check the MULT. slug to make sure it is near the end of travel out of the multiplier coil.

(7) Use a non-metallic alignment screwdriver to adjust trimmer capacitor C-143 through shield hole engraved F for a maximum indication on the output meter.

(8) Rotate the tuning control to the stop at the low frequency end of band F (12.5 to 18.5 megacycle). Back away from the stop two or three turns of the TUNING control.

(9) Adjust the signal generator to the frequency arrived at on the receiver.

(10) Adjust slug engraved MULT. for maximum output. Repeat steps (4) through (10) until satisfied that the oscillator multiplier circuits are "tracking" with the mixer circuits.

(11) Set the BAND selector control on band E (8.5 to 12.5 megacycle) and return the TUNING control to the high frequency end of the band as outlined in step (4).

(12) Adjust trimmer capacitor C-142 through shield hole engraved E for maximum output.

(13) Set the Band selector control on Band B (2500-3500 kc band).

(14) Adjust trimmer capacitor C-141 through shield hole engraved B for maximum output.

d. RF BAND PASS ALIGNMENT PROCEDURE.—To align the r-f band pass channels, proceed as follows:

(1) Rotate the TUNING control to the stop on the high frequency end of the band, then back away from the stop from two to three turns of the TUNING control.

(2) Adjust the signal generator to the frequency arrived at on the receiver. Adjust both the signal generator and the output meter to find the avc threshold level as outlined in steps (7) and (8) under i-f alignment procedure.

(3) Check the band pass and antenna coil tuning slugs of the band or bands to be aligned to make

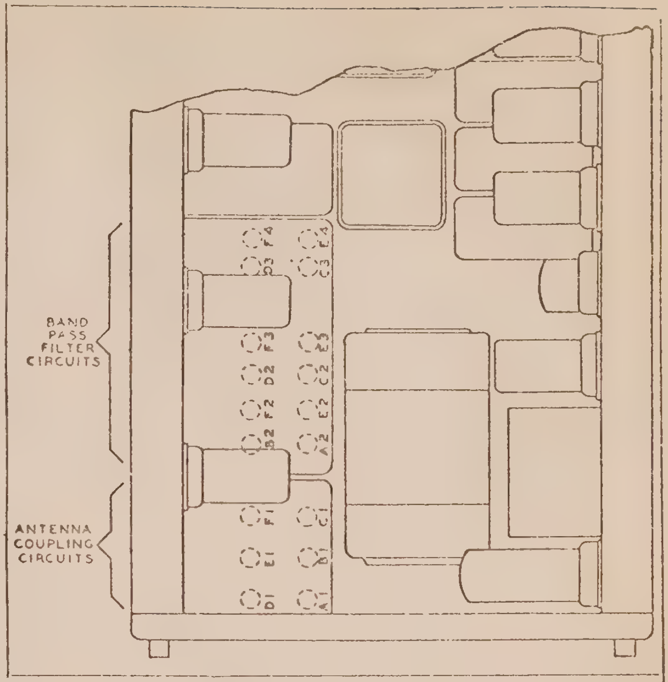


Figure 5-8. Tuned Circuit Locating Diagram, Band Pass and Antenna Coupling Circuits Adjustments

sure they are near the end of travel out of their respective coils. (Refer to figures 5-6, 6-3, 6-4 and 8-9.)

(4) Loosen the screws holding the protective covers of the alignment holes for the antenna coil and band pass coil assemblies, and slide these covers the length of the slots thus exposing the alignment holes. (Refer to figures 5-8, 6-1 and 6-2.)

(5) Stamped on the cover adjacent to each hole will be found a letter and a number. The letter corresponds to the band indicated on the tuning dial and the associated slug as shown on figures 5-6, 6-3 and 6-4. Use a non-metallic alignment screwdriver to adjust the trimmer capacitor corresponding to the band it is desired to adjust.

(6) Trimmer and slug adjustments are numbered consecutively beginning with the antenna coil. Adjustments for any one band should be made beginning with the highest numbered trimmer or slug adjustment and proceed to lower numbered trimmer and slug adjustments. It should be noted that the number of tuned circuits varies with the frequency bands, increasing in number as the frequency is raised.

(7) Each trimmer should be adjusted for maximum reading on the output meter, taking care to back off the signal generator output so as not to exceed the avc threshold level determined in step (2).

(8) After the high frequency end of a given band is adjusted according to the above procedure, tuning control should be rotated to the stop at the low frequency end of the band. Back away from the stop two or three turns of the TUNING control.

(9) Find the frequency with the signal gener-

ator and adjust the correspondingly designated slug for maximum output meter reading.

(10) Repeat steps (1), (7), (8) and (9) until satisfied that the mixer and antenna circuits are "tracking" with the oscillator multiplier circuits on any given band.

9. TROPICALIZATION.

a. GENERAL. — Tropicalization is the overall treatment of communication equipment with an organic coating to help prevent arcing, drifting and short circuits, due to excessive humidity and condensation prevalent in the tropics and the resultant growth of fungus. The places where shorts are most likely to occur, are usually where wires are soldered together, attached to tube sockets, capacitors, transformers, etc., in other words, on any exposed bare wires and their points of connection. The following instructions for the tropicalization of communication equipment deals with the use of INSL-X #27-SA salicylenilide air dry. Coating material containing a mercury-bearing fungicide should never be used on any part of the equipment which under any condition might be placed near a selenium rectifier, either by the design of the sub-assembly or by close contact thru packaging.

b. COATING MATERIAL.

(1) INSL-X #27-SA contains salicylenilide.

(2) This coating will air dry to touch in not more than fifteen minutes and dry hard in one hour.

(3) The coating material as applied must contain 20 percent or more by weight of non-volatile matter.

(4) The dried film is non-toxic to human beings, so that no injury or skin-irration will be caused to personnel handling the treated equipment.

c. PREPARATION FOR TREATMENT.

(1) Expose all parts, circuit elements, etc., so that the coating may be applied effectively and completely over all surfaces to be treated. On assemblies, the case, cans, covers, shields are removed to expose the parts. Where practicable, bend back untreated cables and loosen terminal boards to expose the underside.

(2) Clean all surfaces of parts to be coated so that they are free from dirt, oil, grease or other foreign matter which would interfere with the adherence or proper function of the coating material. Scrape off all visible deposits of rosin. The use of solvents is not advisable here as it tends to spread a thin coat of rosin over a large area.

(3) Mask all surfaces or parts where the coating application will interfere with the operation or performance of the equipment. The following are examples of surfaces which are not to be treated.

(a) Contact portion of: binding posts, connectors, fuses, jacks, keys, plugs, relays, sockets, switches and variable capacitors.

(b) Surfaces which rub together for electrical or magnetic contact such as those in: bearings, contact fingers, potentiometers, shafts, shields and relays.

(c) Components, parts, and materials such as: cables with plastic insulation, ceramic or mica dielectric capacitors.

(4) Tube socket contacts may be masked by using dummy tubes to protect points of contact.

(5) All surfaces to be coated must be completely dry. Preheating may be necessary to dry parts, if so, the preheating temperature must be safely below the point which may damage the materials.

(6) The same masking materials ordinarily used in painting may be utilized.

d. METHODS OF APPLICATION.

(1) Spraying.

(a) Use a spray gun of a size suitable to the particular operation. The correct amount of pressure applied to the spray gun should be determined by actual experimenting. The ideal pressure will give a wet, even coating. Too great a pressure will give a dry spray. Too wet a spray may give runs and sags.

(b) Spray the equipment from as many diderections and angles as is necessary to insure complete coverage with a wet coat.

(c) Surfaces that can not be reached with the spray should be finished with a brush application.

(2) Brushing.

(a) On components requiring extensive masking, brush application of the coating material may prove more efficient than spray application.

(b) Use a container with an opening just large enough to admit the brush.

(c) Place as little coating material in the container as possible. Always fill containers from safety cans. These precautions minimize danger from toxic fumes. Evaporation is also minimized, thus avoiding changes in viscosity which make the material hard to apply.

(d) Apply the coating to the surface of the parts to be treated, with the same precautions used with ordinary painting or varnishing. Avoid running, lumping, or gathering of the coating material into drops. Apply in such a manner that the dried film shall have a clear smooth finish free from defects such as bubbles and wrinkles.

e. DRYING.

(1) Dry the equipment under a hood, or in a well ventilated room, to avoid possible toxic effects of solvent fumes.

(2) The temperature should be between 21.1°C (70°F) and 37.8°C (100°F). The air must be circulating in order to get quick, complete evaporation of liquids.

f. PROTECTION FROM TOXIC EFFECTS. — The greatest danger from any possible effects will be at the moment of evaporation. Proper care in drying will minimuze this danger. Special clothing is not required except for the few people who are allergic to the compounds used. Respirators will be necessary only where a heavy concentration of spray is present, or wherever the use of paint or clear lacquer would require this precaution.

NOTES:

1. Test Instruments
   (a) 1000 ohms per volt
   TS-297/U Multimeter or
   Weston 663 } alternates
   Simpson 443
   (b) 20,000 ohms per volt
   TS-352/U Multimeter or
   Navy "OE"
   Simpson 260 } alternates
   Hickock 133
2. All readings made to ground with input voltage of 27 volts.
3. First reading made with 20,000 ohm per volt meter and second reading made with 1000 ohm per volt meter.
4. If only one reading is shown, values are identical with both meters.
5. Meter scales (letter suffixes) are as follows:
   A—2.5 v C—50 v
   B—10 v D—250 v

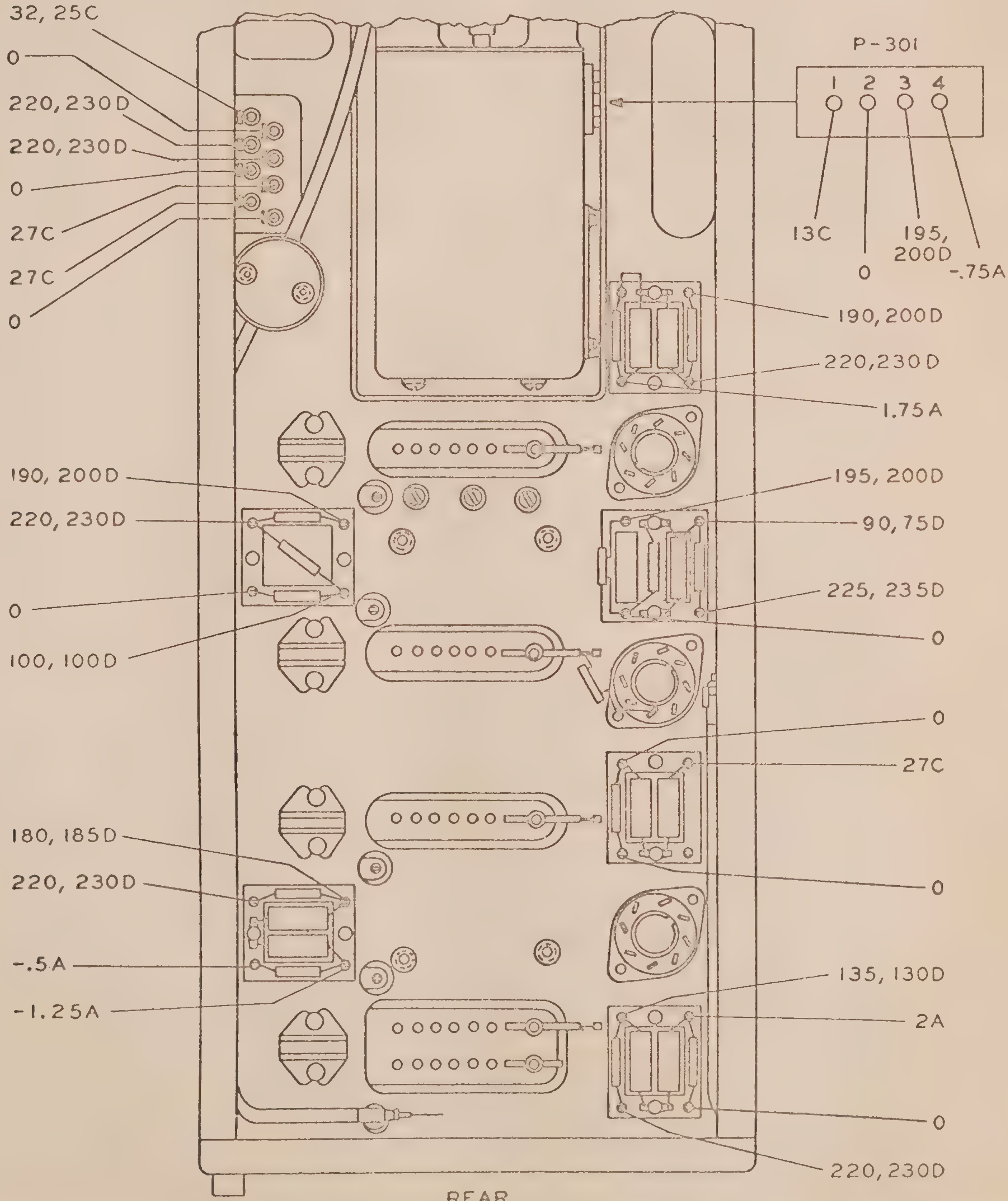


Figure 5-9. Voltage Measurements—Right Side

NOTES:

1. Test Instruments
   - (a) 1000 ohms per volt
     - TS-297/U Multimeter or
     - Weston 663 } alternates
     - Simpson 443 }
   - (b) 20,000 ohms per volt
     - TS-352/U Multimeter or
     - Navy, "OE"
     - Simpson 260 } alternates
     - Hickock 133 }
2. All readings made to ground with input voltage of 27 volts.
3. First reading made with 20,000 ohm per volt meter and second reading made with 1000 ohm per volt meter.
4. If only one reading is shown, values are identical with both meters.
5. Meter scales (letter suffixes) are as follows:
   - A—2.5 v   C—50 v
   - B—10 v   D—250 v

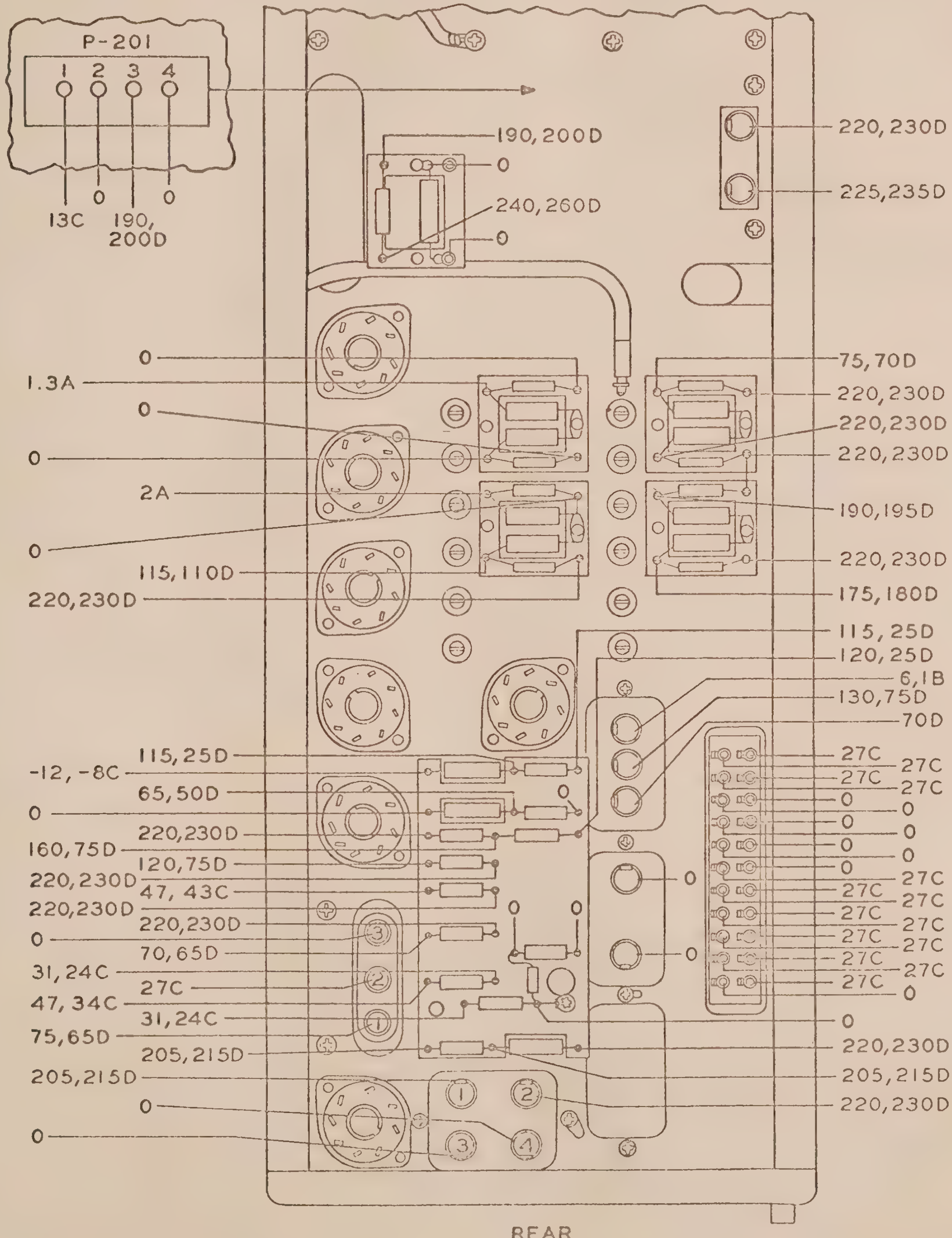


Figure 5-10. Voltage Measurements—Left Side

NOTES:

1. Test Instruments
   (a) 1000 ohms per volt
       TS-297/U Multimeter or
       Weston 663 } alternates
       Simpson 443
   (b) 20,000 ohms per volt
       TS-352/U Multimeter or
       Navy 'OE"
       Simpson 260 } alternates
       Hickock 133
2. All readings made to ground with input voltage of 27 volts.
3. First reading made with 20,000 ohm per volt meter and second reading made with 1000 ohm per volt meter.
4. If only one reading is shown, values are identical with both meters.
5. Meter scales (letter suffixes) are as follows:
   A—2.5 v C—50 v
   B—10 v D—250 v

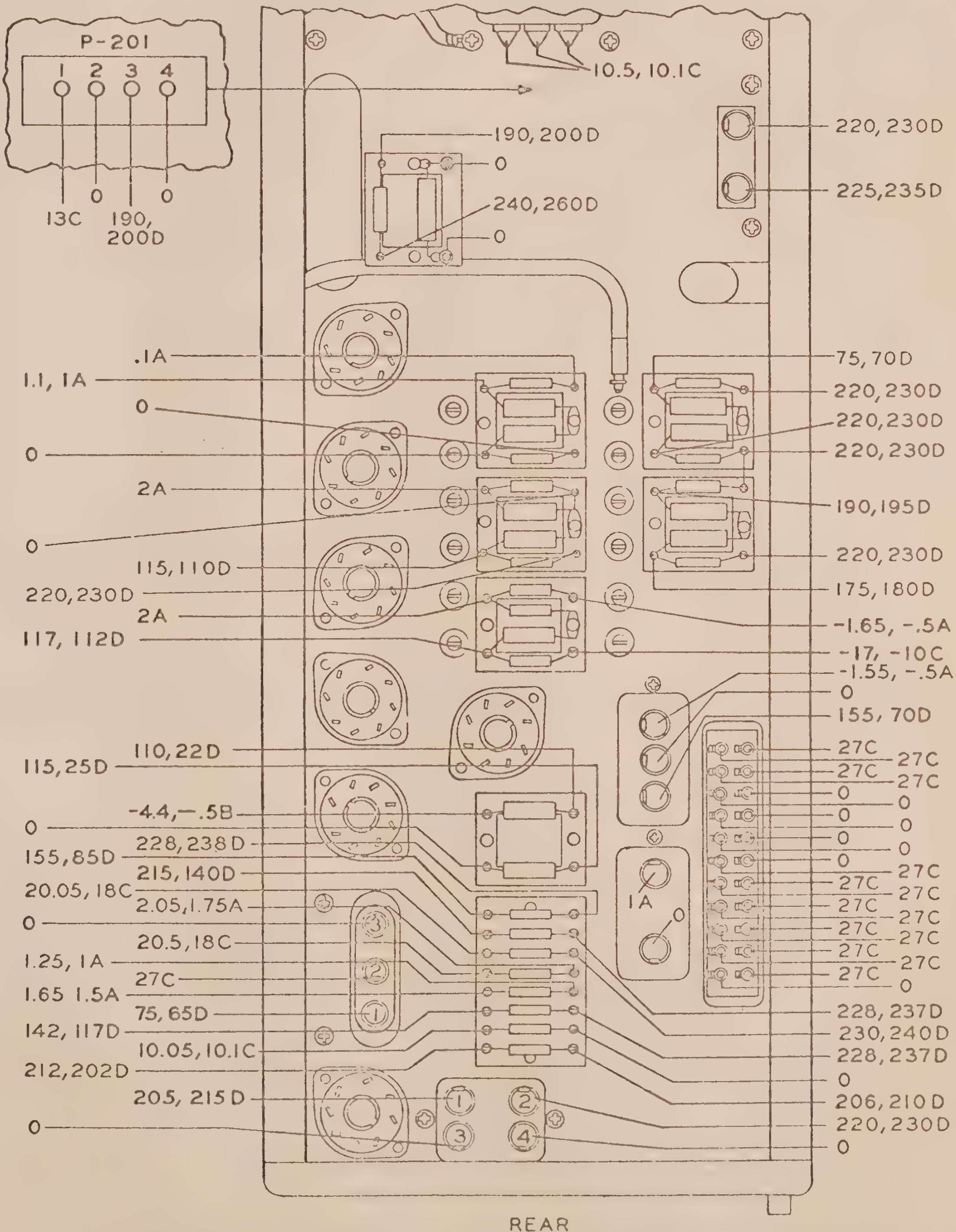
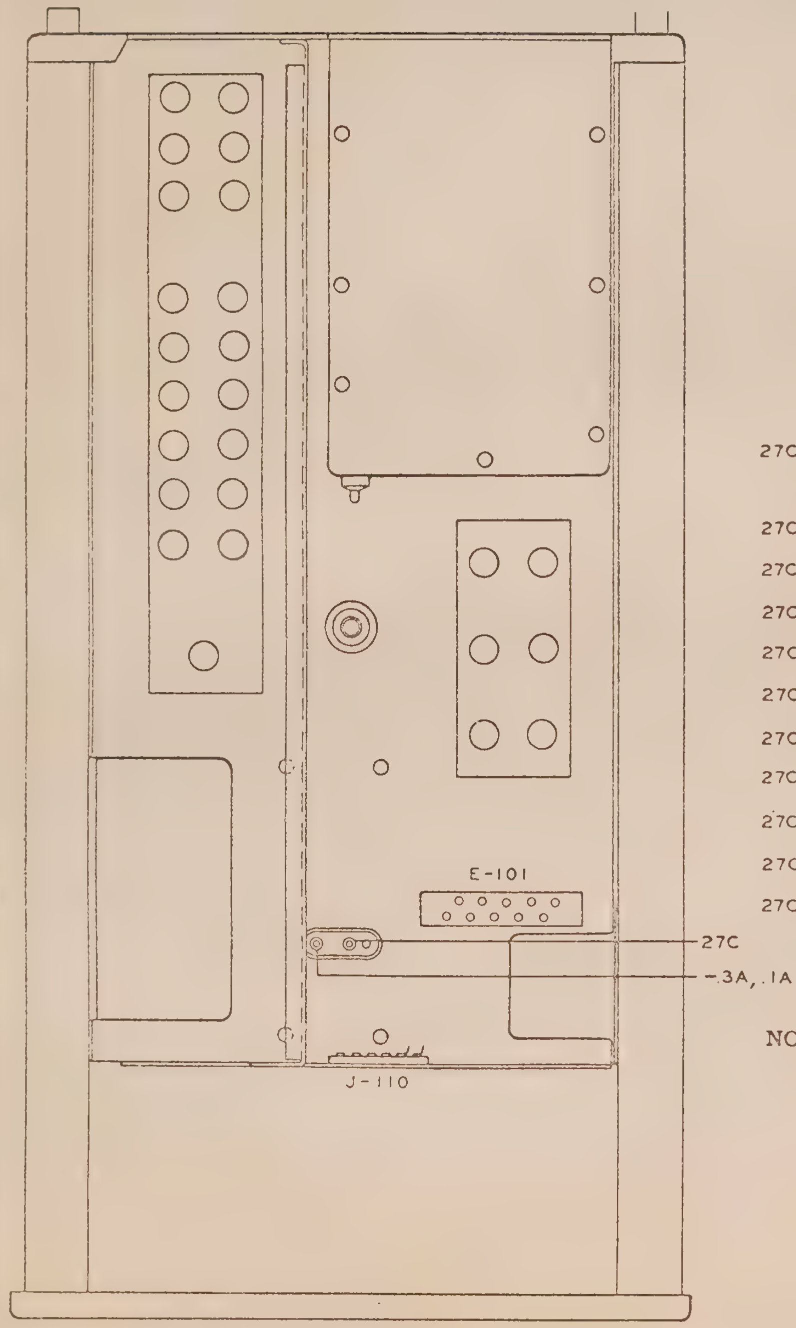
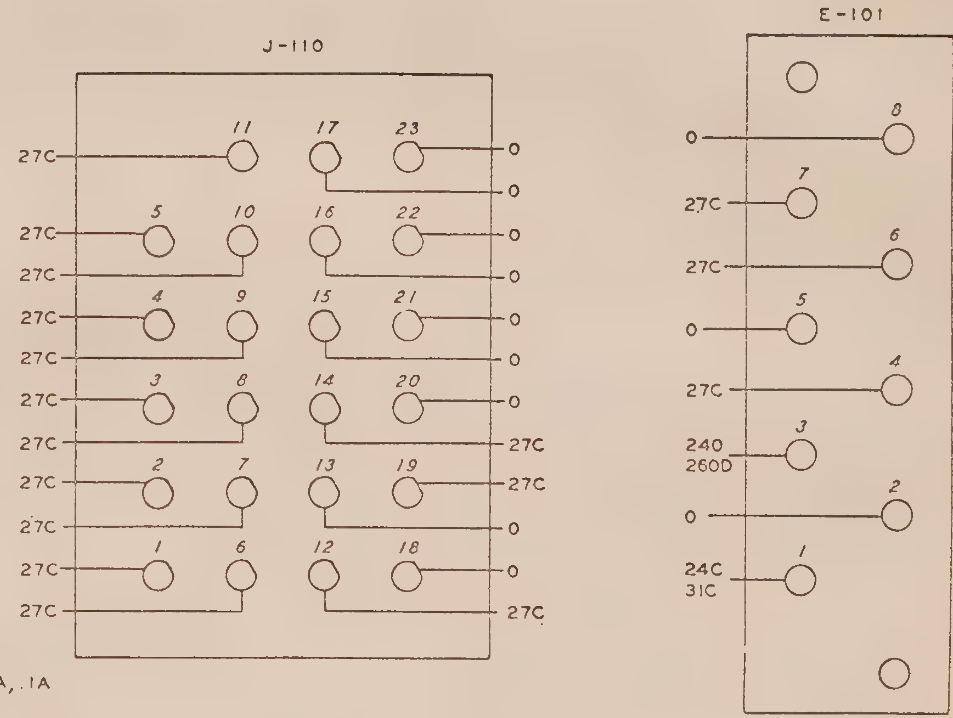


Figure 5-10A. AN/ARR-15A Voltage Measurements—Left Side





NOTES:

1. Test Instruments
   (a) 1000 ohms per volt
       TS-297/U Multimeter or
       Weston 663 } alternates
       Simpson 443
   (b) 20,000 ohms per volt
       TS-352/U Multimeter or
       Navy "OE"
       Simpson 260 } alternates
       Hickock 133
2. All readings made to ground with input voltage of 27 volts.
3. First reading made with 20,000 ohm per volt meter and second reading made with 1000 ohm per volt meter.
4. If only one reading is shown, values are identical with both meters.
5. Meter scales (letter suffixes) are as follows:
   A—2.5 v   C—50 v
   B—10 v   D—250 v

Figure 5-11. Voltage Measurements—Bottom

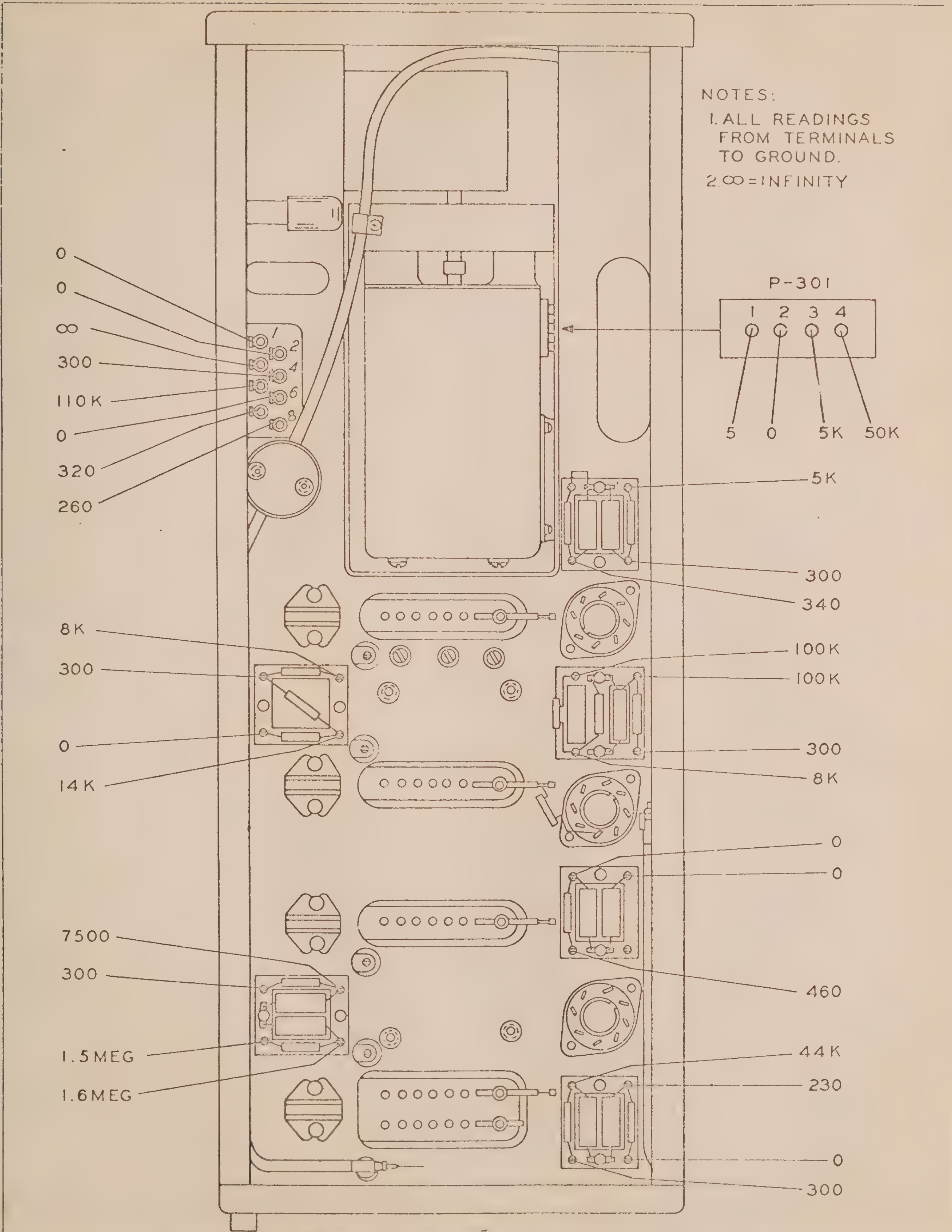


Figure 5-12. Resistance Measurements—Right Side

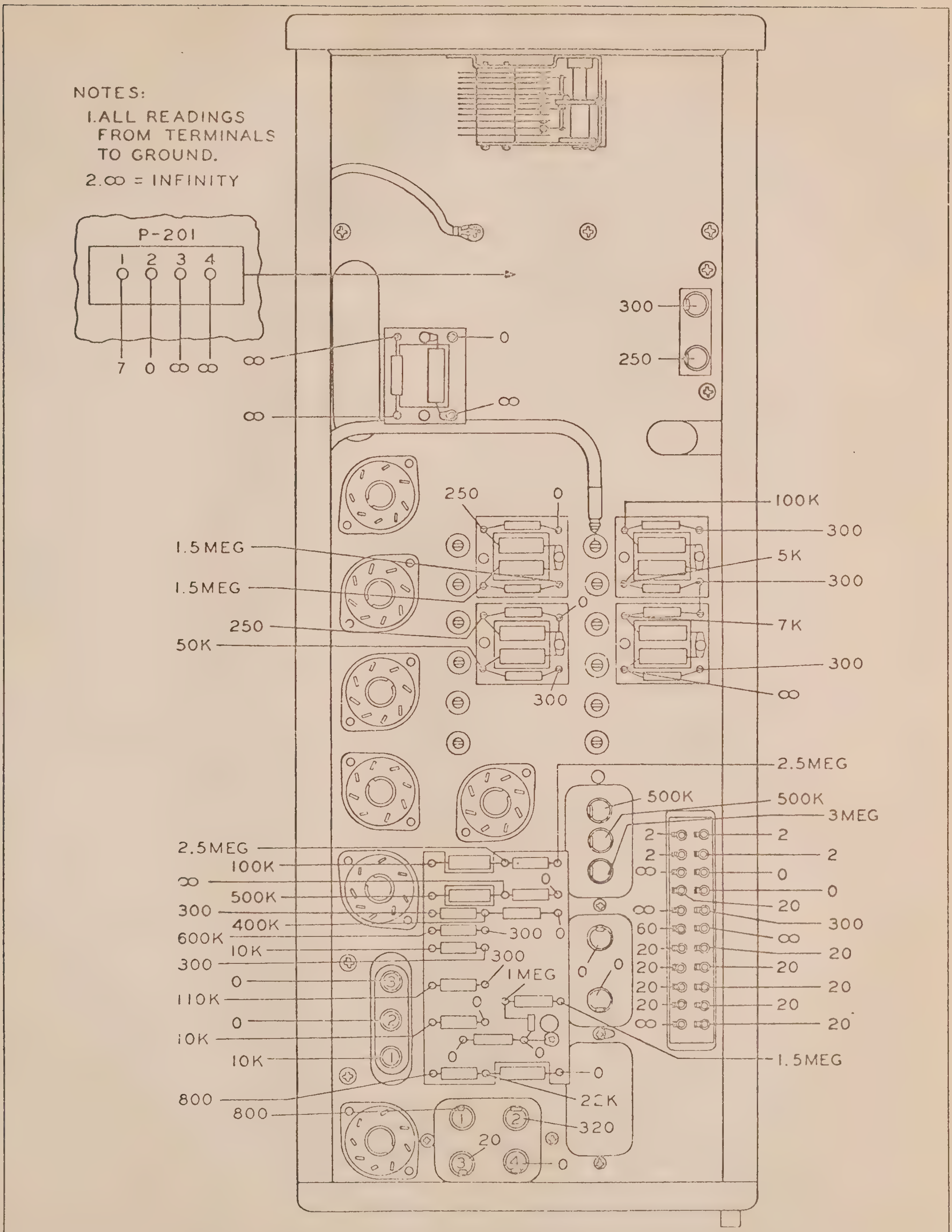


Figure 5-13. Resistance Measurements—Left Side

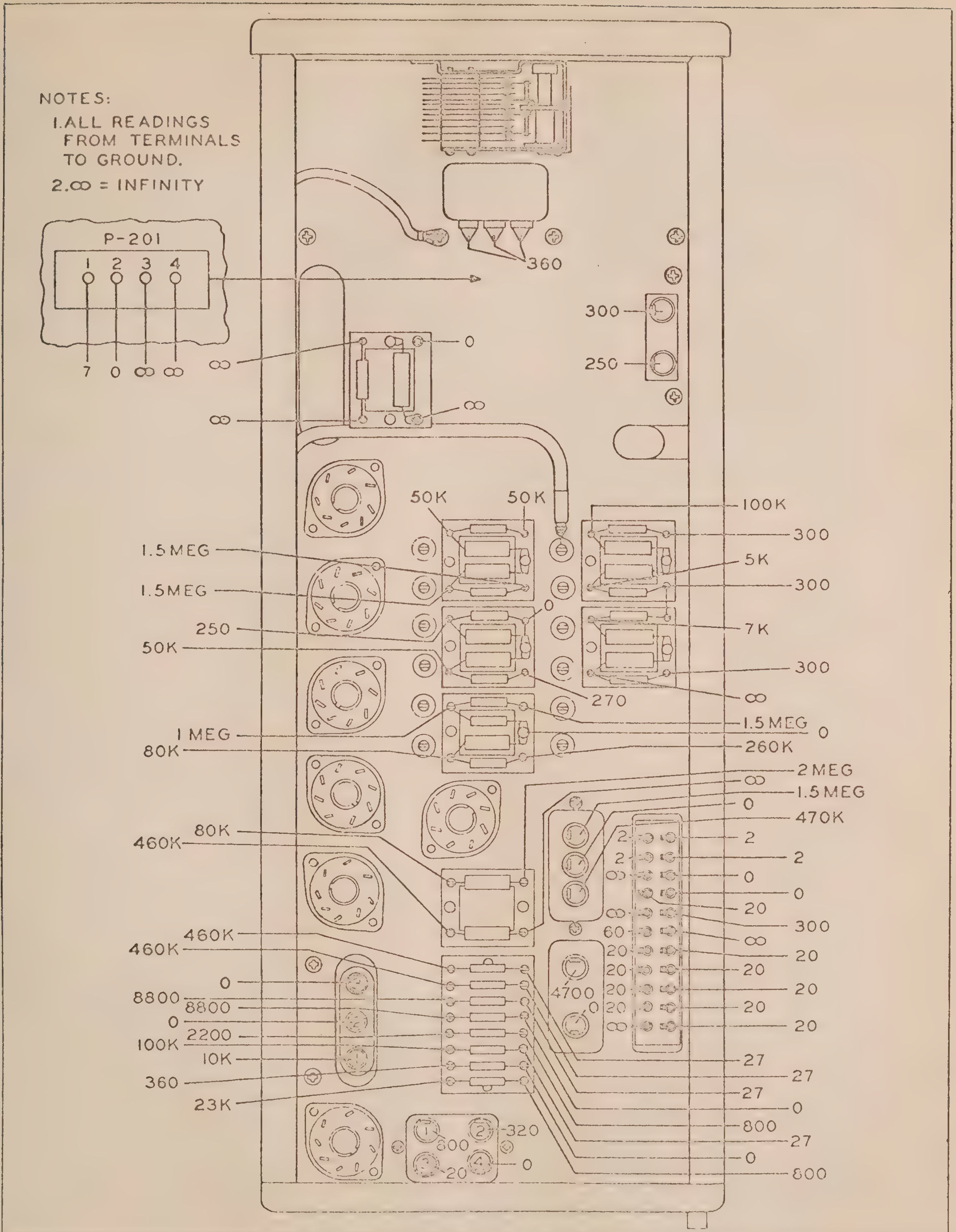


Figure 5-13A. AN/ARR-15A Resistance Measurements—Left Side

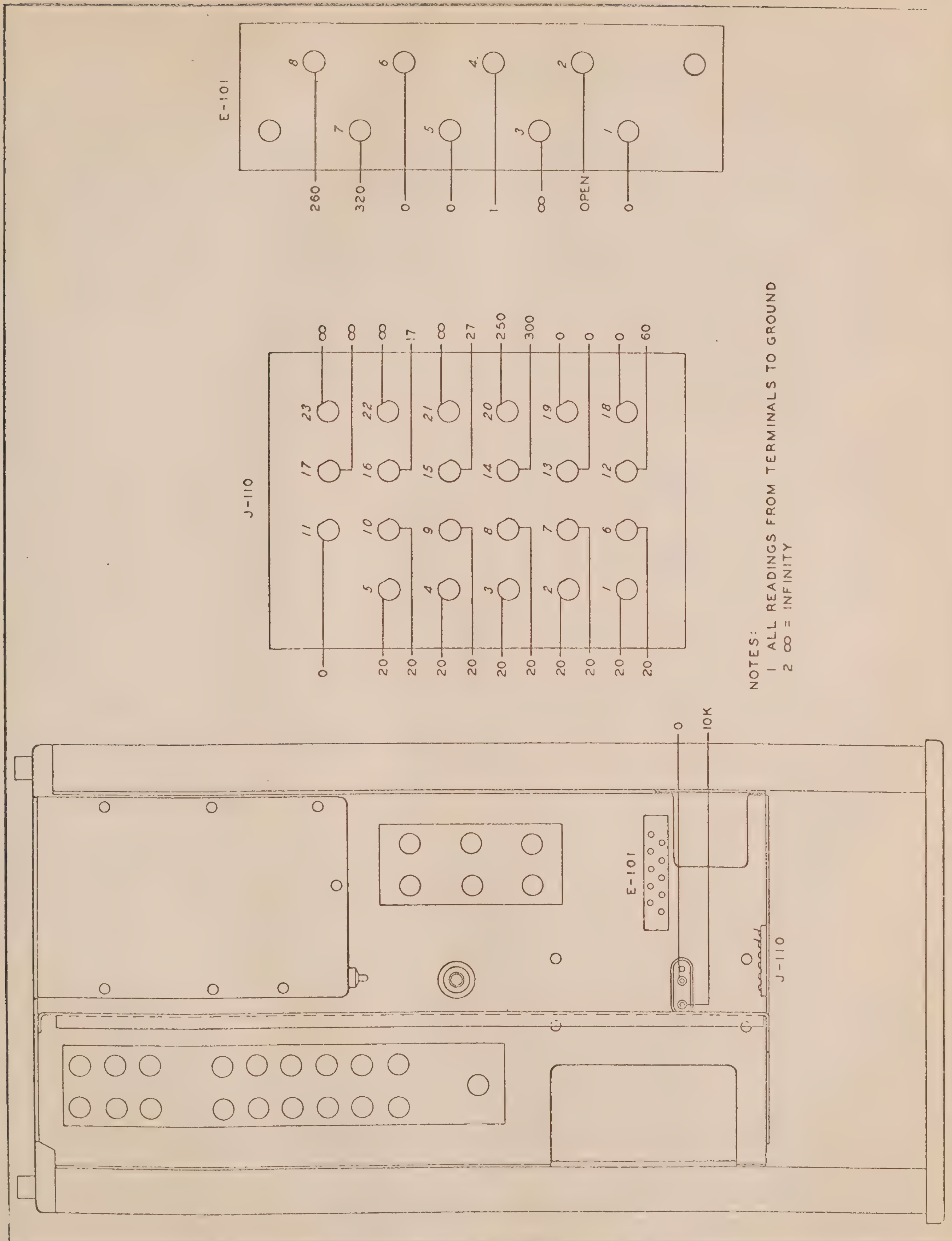
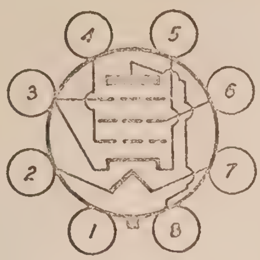


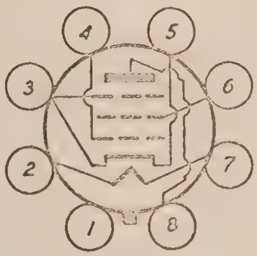
Figure 5-14. Resistance Measurements — Bottom

VOLTAGE TO GROUND (VOLTS)

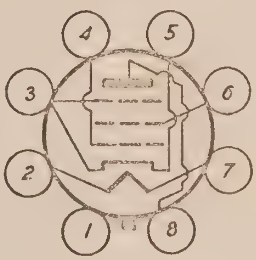
V-101
12SG7



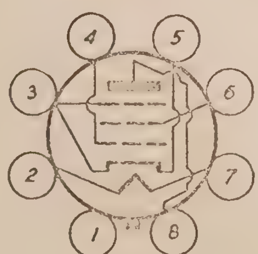
V-102
12SG7



V-103
12SG7



V-104
12SG7



Tube	Tube Pin Number	1000 Ohms Per Volt	*Scale	20,000 Ohms Per Volt	*Scale	Resistance To Ground (Ohms)
V-101 12SG7	1	0		0		0
	2	0		0		0
	3	1.55	A	1.7	A	230
	4	— .1	A	— .6	A	1.7 meg
	5	1.55	A	1.7	A	230
	6	127	D	137	D	45 K
	7	13	C	13	C	7
	8	183	D	183	D	7,500
V-102 12SG7	1	0		0		0
	2	27.5	C	26.5	C	1
	3	.1	A	.1	A	490
	4	— .25	A	— .7	A	500 K
	5	.1	A	.1	A	490
	6	— .05	A	— .05	A	100 K
	7	13	C	13	C	7
	8	227	D	227	D	6,000
V-103 12SG7	1	0		0		0
	2	13	C	13	C	8
	3	1.25	A	1.35	A	250
	4	0		0		1.6 meg
	5	1.25	A	1.35	A	250
	6	70	D	75	D	100 K
	7	27	C	26.5	C	1
	8	192	D	192	D	7,500
V-104 12SG7	1	0		0		0
	2	27	C	27	C	1
	3	1.8	A	2.1	A	250
	4	0		0		18
	5	1.8	A	2.1	A	250
	6	112	D	117	D	50 K
	7	13.5	C	13.5	C	7
	8	177	D	175	D	7,500

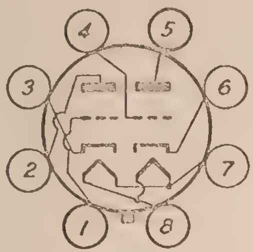
1. Test Instruments—
   - (a) 1000 ohms per volt
     - TS-297/U Multimeter or
     - Weston 663 }
     - Simpson 443 } alternates
   - (b) 20,000 ohms per volt
     - TS-352/U Multimeter or
     - Navy "OE"
     - Simpson 260 } alternates
     - Hickock 133 }

*Meter scales are as follows:
- A = 2.5 v
- B = 10 v
- C = 50 v
- D = 250 v

Figure 5-15. Tube Socket Voltage and Resistance Measurements (Page one of three pages)

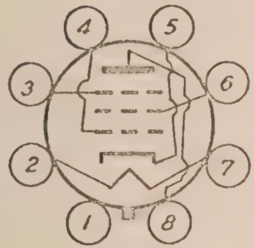
VOLTAGE TO GROUND (VOLTS)

V-105
12SL7



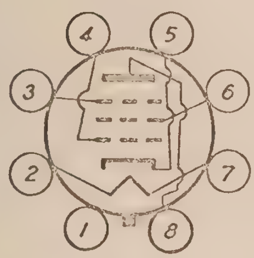
Tube Pin Number	1000 Ohms Per Volt	*Scale	20,000 Ohms Per Volt	*Scale	Resistance To Ground (Ohms)
1	— .05	A	—1.3	A	50 K
2	75	D	147	D	540 K
3	.25	A	.5	A	5 K
4	— .1	A	— .35	A	10 K
5	50	D	90	D	600 K
6	.5	A	101	A	5 K
7	13.5	C	13.5	C	7
8	0		0		0

V-201
12SJ7



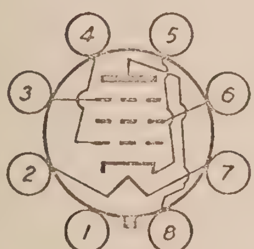
Tube Pin Number	1000 Ohms Per Volt	*Scale	20,000 Ohms Per Volt	*Scale	Resistance To Ground (Ohms)
1	0		0		0
2	0		0		0
3	0		0		0
4	— .09	A	—2.6	A	160 K
5	0		0		0
6	110	D	115	D	Inf
7	13.5		13.5		14
8	230	D	230	D	Inf

V-401
12SJ7



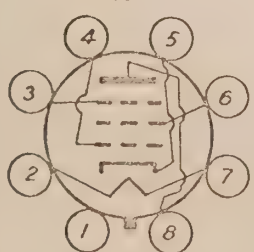
Tube Pin Number	1000 Ohms Per Volt	*Scale	20,000 Ohms Per Volt	*Scale	Resistance To Ground (Ohms)
1	0		0		0
2	13.5	C	13.5	C	13.5
3	0		0		0
4	— .25	A	—2.25	A	110 K
5	0		0		0
6	72.5	D	75	D	100 K
7	27	C	27	C	Inf
8	113	D	115	D	150 K

V-402
12SJ7



Tube Pin Number	1000 Ohms Per Volt	*Scale	20,000 Ohms Per Volt	*Scale	Resistance To Ground (Ohms)
1	0		0		0
2	0		0		0
3	0		0		0
4	—28	C	—30.2	C	50 K
5	0		0		0
6	22		39	C	230 K
7	13.5	C	13.5	C	13.5
8	5.5	B	7.6	B	5 K

V-301
12SJ7



Tube Pin Number	1000 Ohms Per Volt	*Scale	20,000 Ohms Per Volt	*Scale	Resistance To Ground (Ohms)
1	0		0		0
2	0		0		0
3	0		0		0
4	— .20	A	— .45	A	165 K
5	0		0		0
6	117	D	130	D	Inf
7	13.5		13.5		14
8	230	D	230	D	Inf

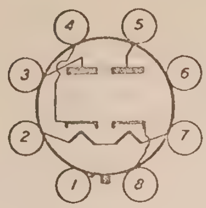
*Meter scales are as follows: A = 2.5 v, B = 10 v, C = 50 v, D = 250 v

1. Test Instruments—
   (a) 1000 ohms per volt
   TS-297/U Multimeter or
   Weston 663 } alternates
   Simpson 443 }
   (b) 20,000 ohms per volt
   TS-352/U Multimeter or
   Navy "OE" }
   Simpson 260 } alternates
   Hickock 133 }

Figure 5-15. Tube Socket Voltage and Resistance Measurements (Page two of three pages)

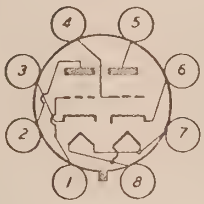
VOLTAGE TO GROUND (VOLTS)

V-110
12H6



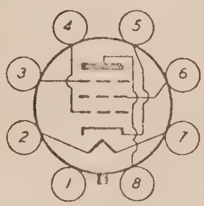
Tube Pin Number	1000 Ohms Per Volt	*Scale	20,000 Ohms Per Volt	*Scale	Resistance To Ground (Ohms)
1	0		0		0
2	0		0		0
3	25	D	112	D	2.5 meg
4	40	D	112	D	Inf
5	40	D	112	D	Inf
6	NC 0	A	NC .05	A	27,000
7	13.5	C	13.5	C	7
8	75	D	125	D	600 K

V-106
12SL7



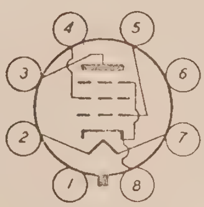
Tube Pin Number	1000 Ohms Per Volt	*Scale	20,000 Ohms Per Volt	*Scale	Resistance To Ground (Ohms)
1	2.0	C	23.5	C	1 meg
2	2.0	C	23.5	C	1 meg
3	33.5	C	47.5	C	9,500
4	0		0		0
5	0		0		1 meg
6	4	C	32	C	510,000
7	13.5	C	13.5	C	7
8	0		0		0

V-107
12SJ7



Tube Pin Number	1000 Ohms Per Volt	*Scale	20,000 Ohms Per Volt	*Scale	Resistance To Ground (Ohms)
1	0		0		0
2	13.5	C	13.5	C	7
3	2.4	A	2.5	A	2,500
4	0		0		500 K
5	2.4	A	2.5	A	2,500
6	65	D	70	D	110 K
7	0		0		1
8	2.4	A	2.5	A	110 K

V-108
12A6



Tube Pin Number	1000 Ohms Per Volt	*Scale	20,000 Ohms Per Volt	*Scale	Resistance To Ground (Ohms)
1	0		0		0
2	13.5	C	13.5	C	7
3	210	D	205	D	800
4	230	D	220	D	300
5	0		0		1,300
6	—		—		Inf
7	27	C	27	C	1
8	10	B	10	B	3,400

V-109
12SG7

Tube Pin Number	1000 Ohms Per Volt	*Scale	20,000 Ohms Per Volt	*Scale	Resistance To Ground (Ohms)
1	0		0		0
2	12.5	C	12.5	C	7
3	1.5	A	1.7	A	320
4	— .1	A	— .7	A	50 K
5	1.5	A	1.7	A	320
6	70	D	85	D	100 K
7	27	C	27	C	1
8	187	D	187	D	7,500

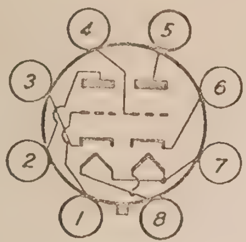
*Meter scales are as follows: A = 2.5 v, B = 10 v, C = 50 v, D = 250 v

1. Test Instruments—
   (a) 1000 ohms per volt
   TS-297/U Multimeter or
   Weston 663 } alternates
   Simpson 443 }
   (b) 20,000 ohms per volt
   TS-352 U Multimeter or
   Navy "OE" }
   Simpson 260 } alternates
   Hickock 133 }

Figure 5-15. Tube Socket Voltage and Resistance Measurements (Page three of three pages)

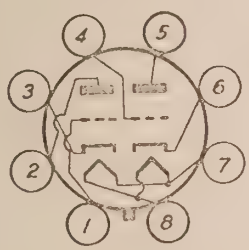
VOLTAGE TO GROUND (VOLTS)

V-105
12SL7



Tube Pin Number	1000 Ohms per Volt	*Scale	20,000 Ohms per Volt	*Scale	Resistance to Ground (Ohms)
1	0	A	—.25	A	30K
2	60	D	95	D	46K
3	.75	A	1.3	A	4700
4	—.35	A	—.7	A	25K
5	—.35	A	—.7	A	25K
6	0	A	0	A	0
7	13.5	C	13.5	C	8
8	0	A	0	A	0

V-107
12SL7



Tube Pin Number	1000 Ohms per Volt	*Scale	20,000 Ohms per Volt	*Scale	Resistance to Ground (Ohms)
1	0	A	0	A	10K
2	65	D	95	D	460K
3	.75	A	1.35	A	4700
4	0	A	0	A	470K
5	110	D	127	D	15K
6	1	A	1.3	A	2100
7	26.5	C	26.5	C	1
8	13.5	C	13.5	C	8

1. Test Instruments—
   (a) 1000 ohms per volt
   TS-297/U Multimeter or
   Weston 663 } alternates
   Simpson 443 }
   (b) 20,000 ohms per volt
   TS-352/U Multimeter or
   Navy "OE"
   Simpson 260 } alternates
   Hickock 133 }

*Meter scales are as follows:
A= 2.5 v
B=10 v
C=50 v
D=250 v

Figure 5-15A. V-105 and V-107 Tube Socket Voltage and Resistance Measurements for AN/ARR-15A

[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	2.1
[illegible]	2.1	1.5	[illegible]
[illegible]	[illegible]	2.0	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	5.6	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	13.6

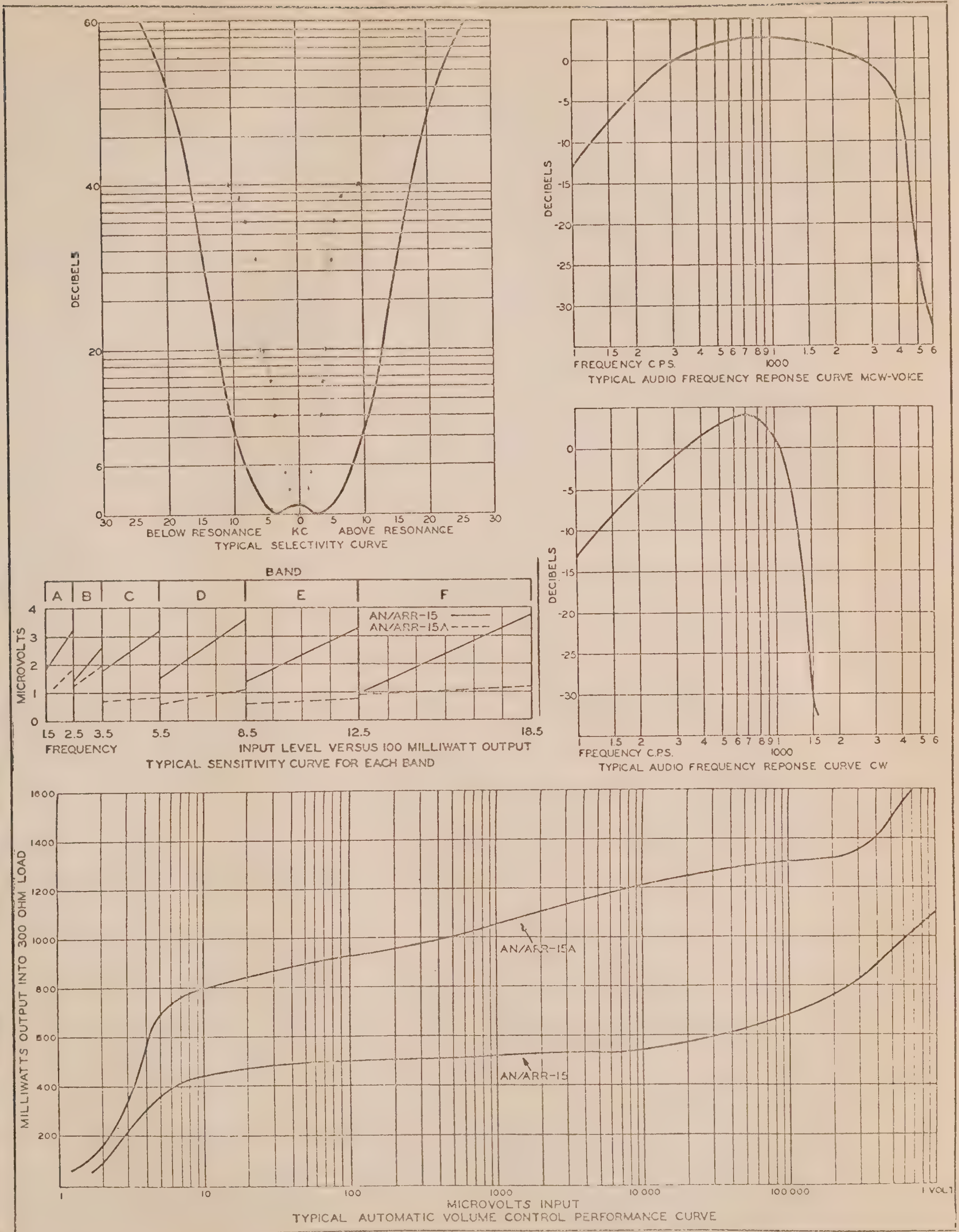


Figure 5-16. Typical Operation Curves

SECTION VI
SUPPLEMENTARY DATA

1. TECHNICAL SUMMARY.

a. TUBE COMPLEMENT.

Tube Type	Symbol Designation	Function
12SG7	V-101	R-F Amplifier
12SG7	V-102	Mixer
12SG7	V-103	First i-f Amplifier
12SG7	V-104	Second i-f Amplifier
12SL7	V-105	*Balancer
12SL7	V-106	AVC
**12SJ7	V-107	Audio Driver
12A6	V-108	Audio Output
12SG7	V-109	Multiplier
12H6	V-110	Limiter
12SJ7	V-201	L-F Oscillator
12SJ7	V-301	H-F Oscillator
12SJ7	V-401	CFI Oscillator
12SJ7	V-402	CFI Amplifier

* Detector in AN/ARR-15A
** 12SL7 in AN/ARR-15A

CAUTION

In order to obtain satisfactory tube life the following precautions must be observed: (1) Operate the tube filaments within plus or minus five per cent of rated voltages; (2) Do not exceed rated plate current through any of the tubes during normal operation of the equipment.

b. FREQUENCY RANGE. — This equipment is capable of receiving signals on any frequency within the range 1500 to 18,500 kc.

c. FREQUENCY BANDS.—The frequency range 1500 to 18,500 kc is covered in six bands. The six positions of the Band Control, together with the frequency range covered by each band, is given below:

Band	Frequency Range
A	1.5 mc to 2.5 mc
B	2.5 mc to 3.5 mc
C	3.5 mc to 5.5 mc
D	5.5 mc to 8.5 mc
E	8.5 mc to 12.5 mc
F	12.5 mc to 18.5 mc

d. NUMBER OF PRE-SET FREQUENCIES. — Ten pre-set frequency channels are provided for voice, cw or mcw reception from a remote control point or from the receiver unit. It is possible to unlock the controls on the panel and manually tune the receiver on any channel without changing the setting of the controls for the other nine channels.

e. FREQUENCY STABILITY. — The frequency stability of the complete equipment is such as to maintain the resonant frequency of the receiver within plus or minus .03% of a given frequency. The stability tolerance is overall and includes all frequency changes accompanying operation of the equipment, plus frequency changes due to inaccuracies in the channel selecting mechanism. After the adjustment of the controls for the ten channels, subsequent reception on each channel will be possible with a resulting receiver resonant frequency within the allowed tolerance of the frequency to which the channel was originally adjusted.

f. ELECTRICAL CHARACTERISTICS OF RECOMMENDED ANTENNAS.—The antenna coupling circuit has been designed to operate satisfactorily with an aircraft type antenna ranging from 17 feet to 40 feet in length.

g. AUDIO OUTPUT IMPEDANCE.—The impedance of the audio output channel is 300 ohm.

h. POWER OUTPUT.—The audio output capability will be consistent with avc and noise limiter action. With a r-f input of 10 to 10,000 microvolts, 30% modulated, the distortion will be less than 15%. The audio response will not vary more than plus or minus three db relative to the 100 milliwatt output at 1000 cps.

i. POWER SUPPLY.

(1) VOLTAGE.—This equipment is designed to operate from 26.5 volt d-c power source.

(2) CURRENT REQUIREMENTS AT SPECIFIED RATED VOLTAGE.

(a) Maximum starting current is about 15 amperes.

(b) Maximum required current for Autotune operation is eight and one-half amperes.

(c) Maximum requirements during actual reception is three and one-tenth amperes.

j. DYNAMOTOR.

(1) MANUFACTURER. — A. G. Redmond Company, Owallo, Michigan.

(2) MANUFACTURER'S TYPE.—GH-19.

(3) RATING.

(a) INPUT: 26.5 volts d-c at 1.75 amps.

(b) OUTPUT: 220 volts at .1 amps.

(4) The maximum permissible ambient temperature is +40°C (+104°F).

k. AUDIO FREQUENCY RESPONSE.

(1) MCW-VOICE.—Within plus or minus three db from 300 cps to 3500 cps.

(2) CW.—Down 30 db at 1600 cps from 1200 cps reference and within plus or minus three db from 1200 to 300 cps.

l. SENSITIVITY.—The sensitivity of the receiver is such as to permit the attainment of at least 100 milliwatts audio output at 1000 cps, with the resultant signal plus noise to noise ratio of six db for phone (modulation on vs modulation off), under conditions of a r-f input to the equipment, (30% modulated at 1000 cps for phone measurements) not in excess of five microvolts.

The overall selectivity of the receiver measured at 18,500 kc will fall within the maximum and minimum limits set forth below:

Attenuation db Below Resonance	Kilocycles Off Resonance	
	Maximum	Minimum
6	9.0	7.5
20	14.5	7.5
40	22.5	7.5
60	30.0	7.5

m. AUTOMATIC VOLUME CONTROL PERFORMANCE.—The avc action for phone signals is such that with one millivolt signal, modulated 30% at 1000 cps, the audio output power will be 500 milliwatts (—10% +20%) and when the modulated signal input is varied from 10 to 100,000 microvolts, the audio output power will not vary more than two db relative to the output at one millivolt input. The receiver is protected against blocking under conditions of input signals up to two volts.

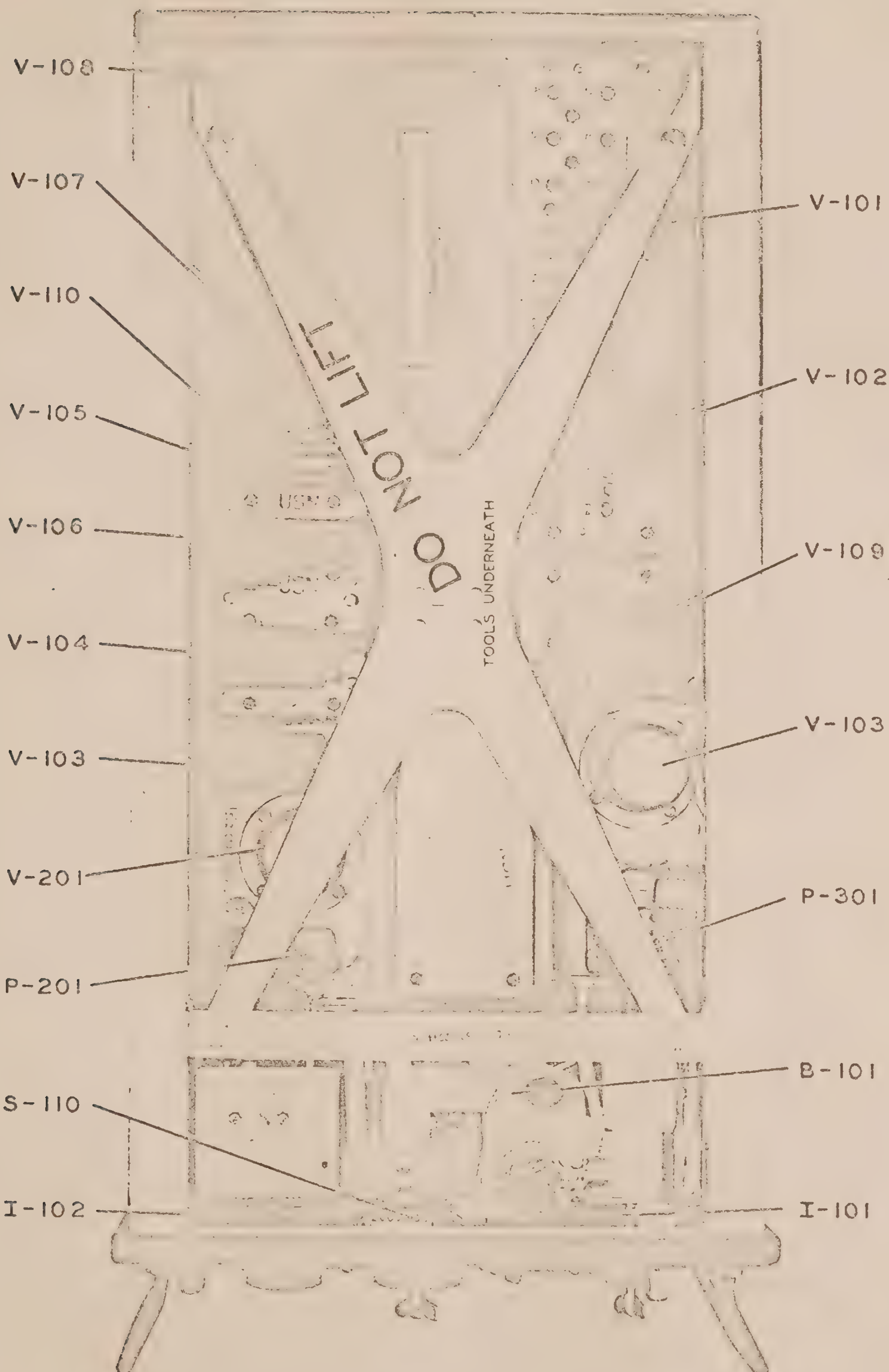


Figure 6-1. Receiver—Top

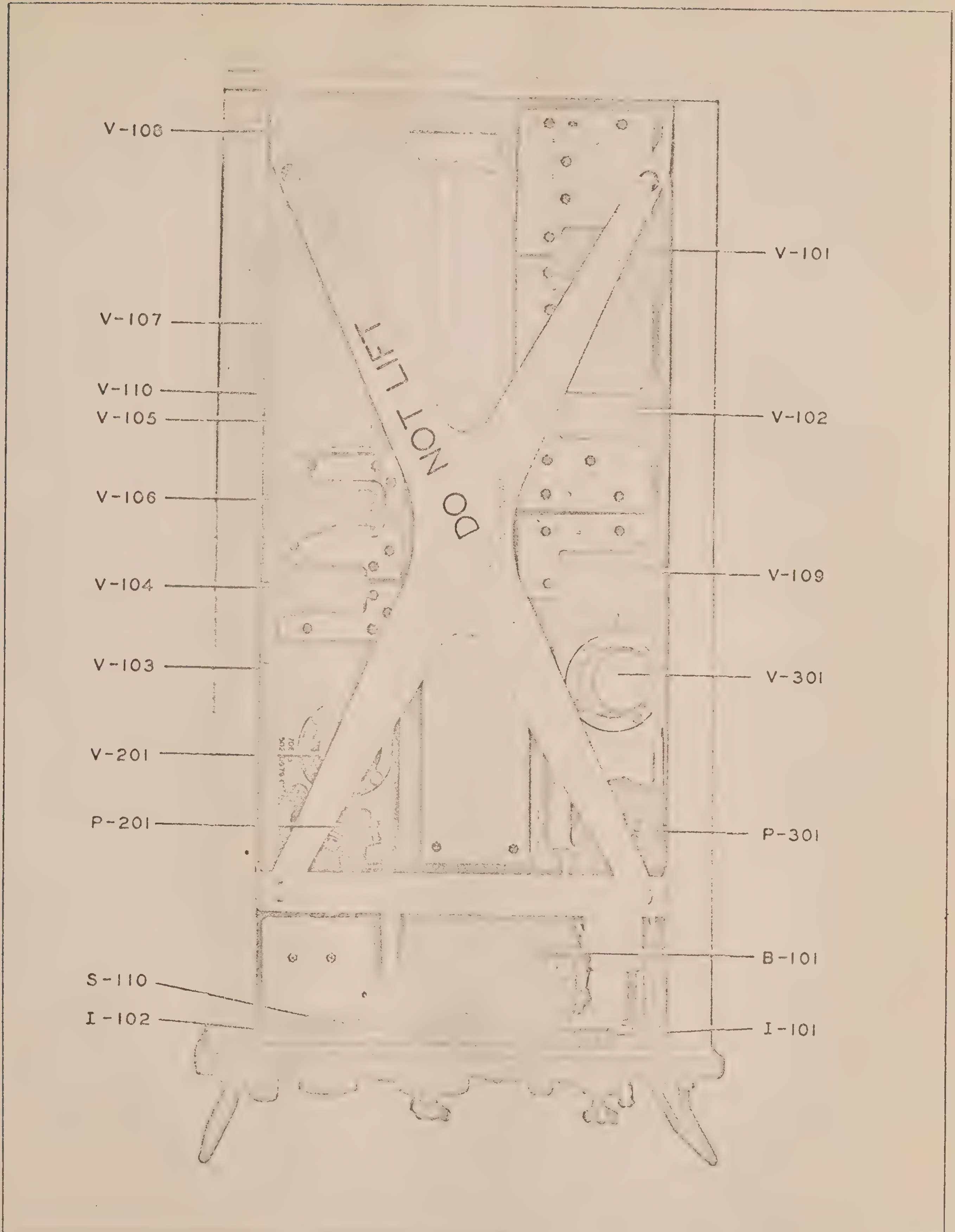


Figure 6-1A. R-105A/ARR-15 Receiver, Top

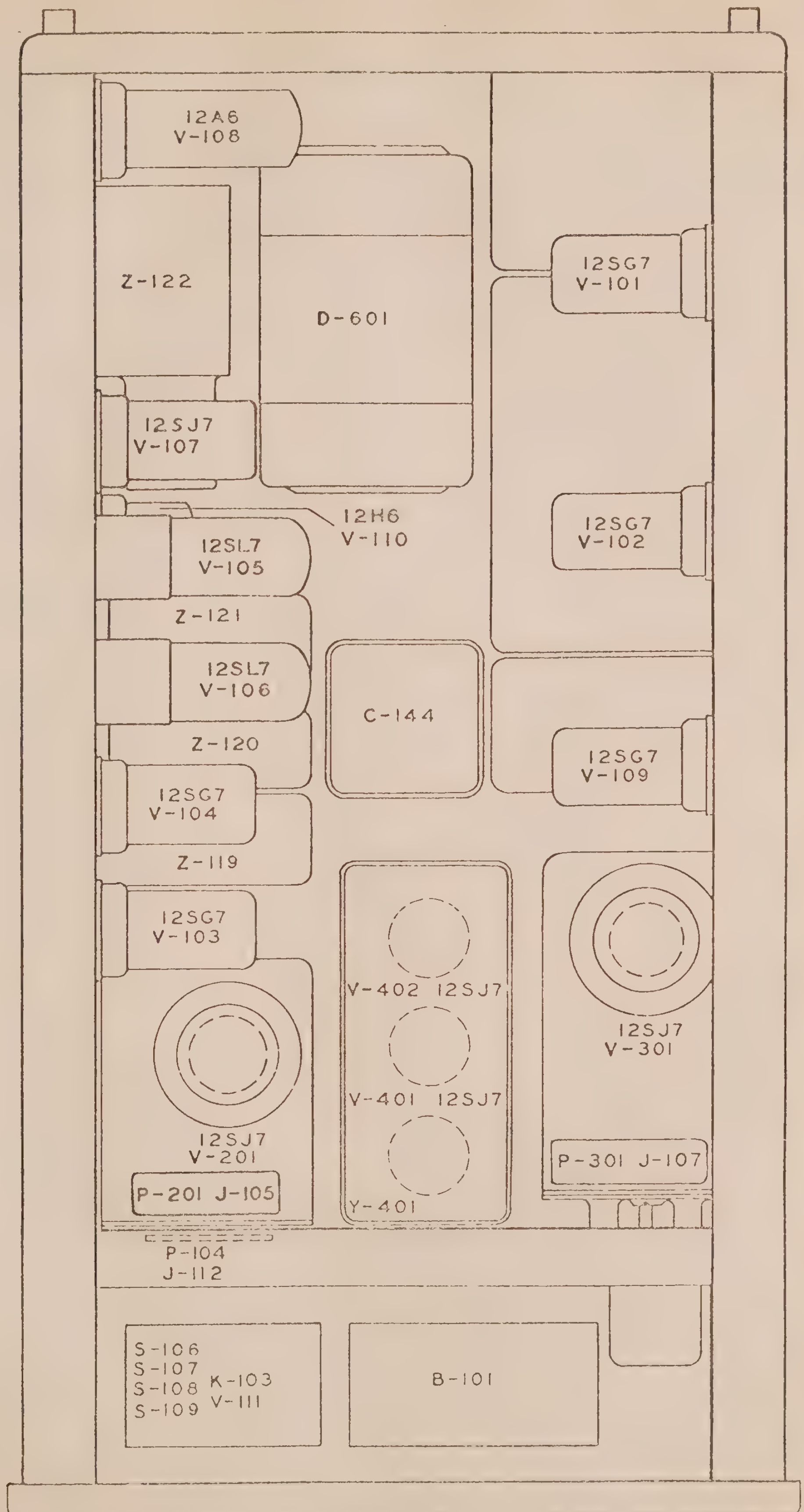


Figure 6-2. Receiver Parts Arrangement—Top

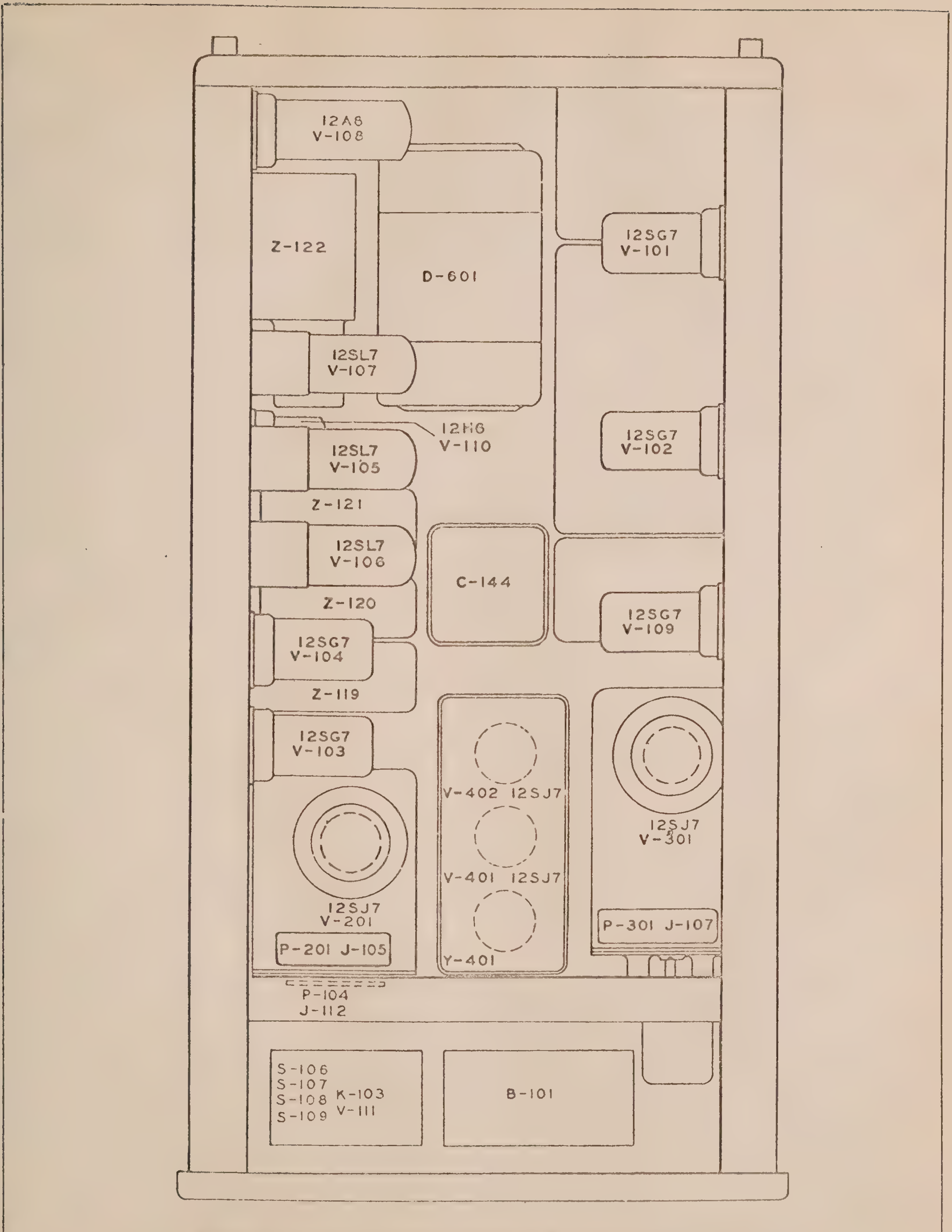


Figure 6-2A. R-105A/ARR-15 Receiver Parts Arrangement, Top

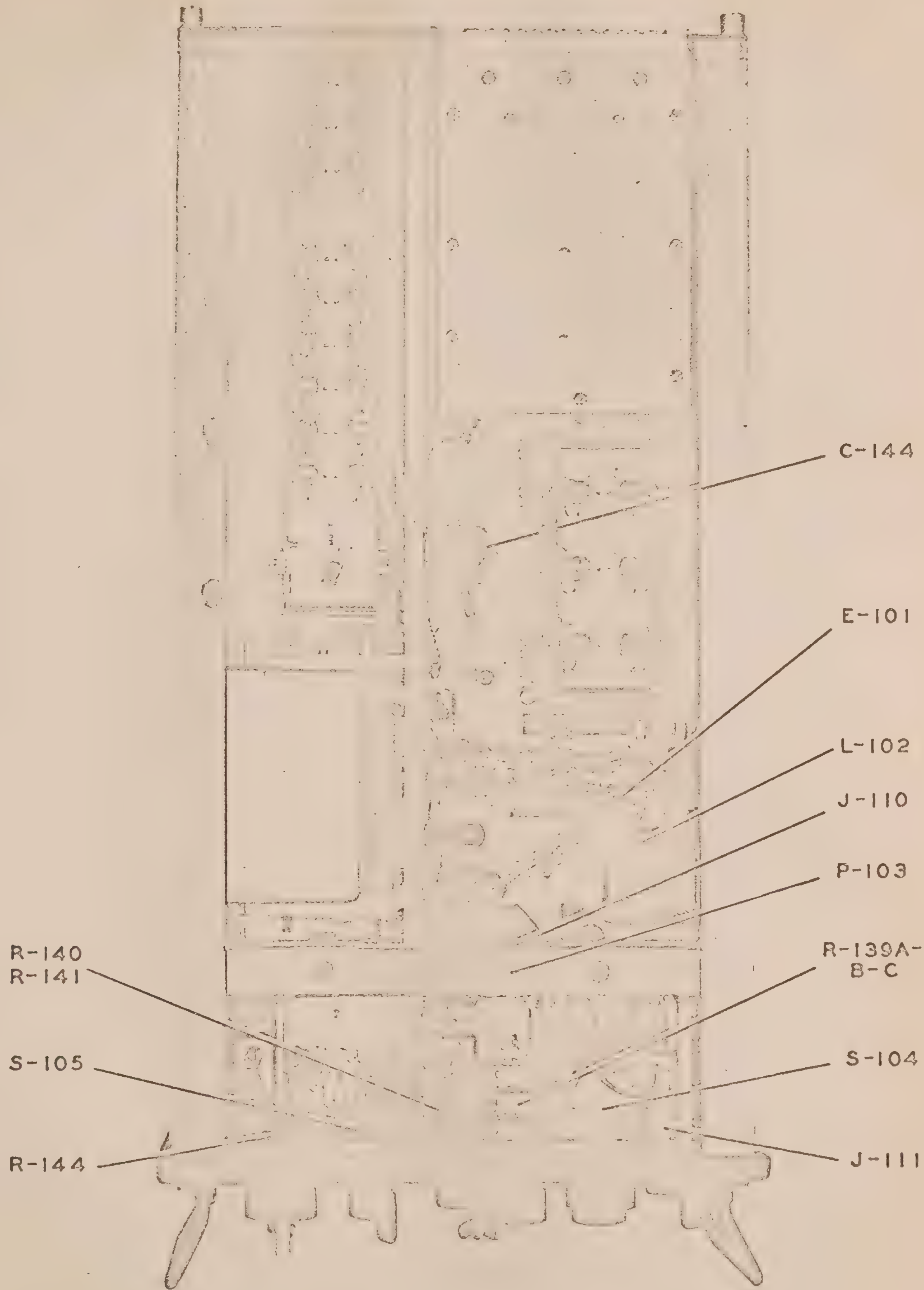


Figure 6-3. Receiver—Bottom

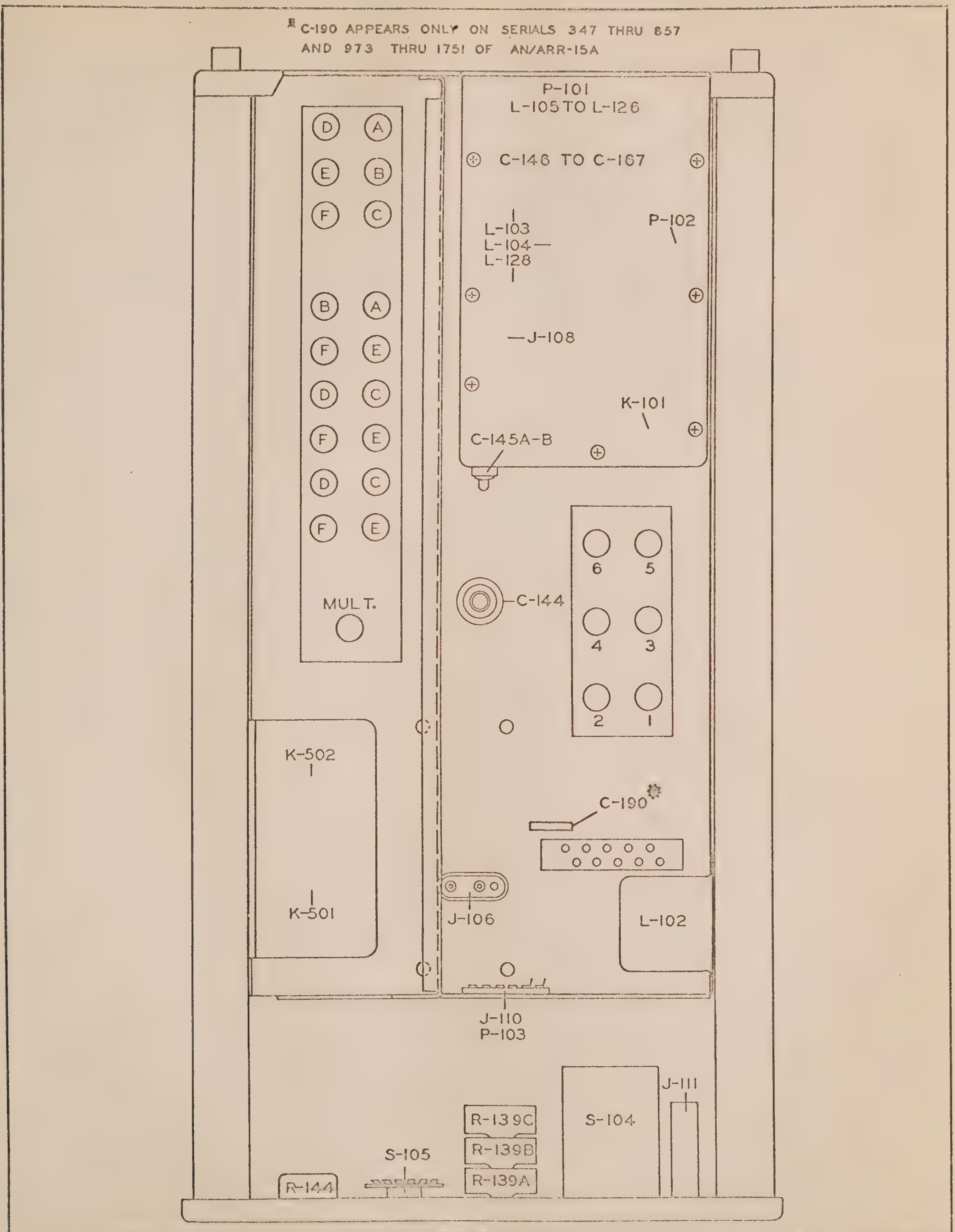


Figure 6-4. Receiver Parts Arrangement — Bottom

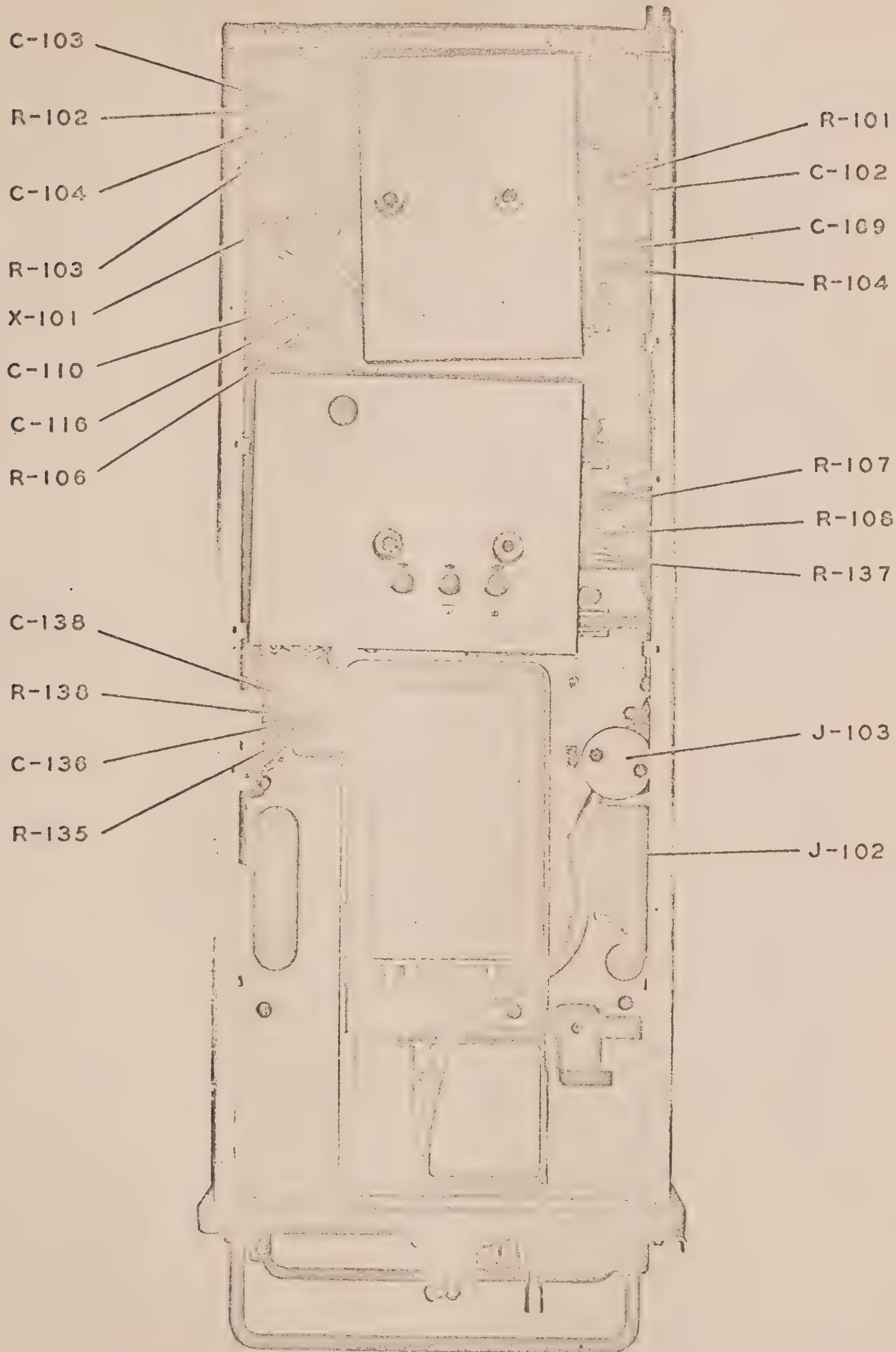


Figure 6-5. Receiver—Right Side

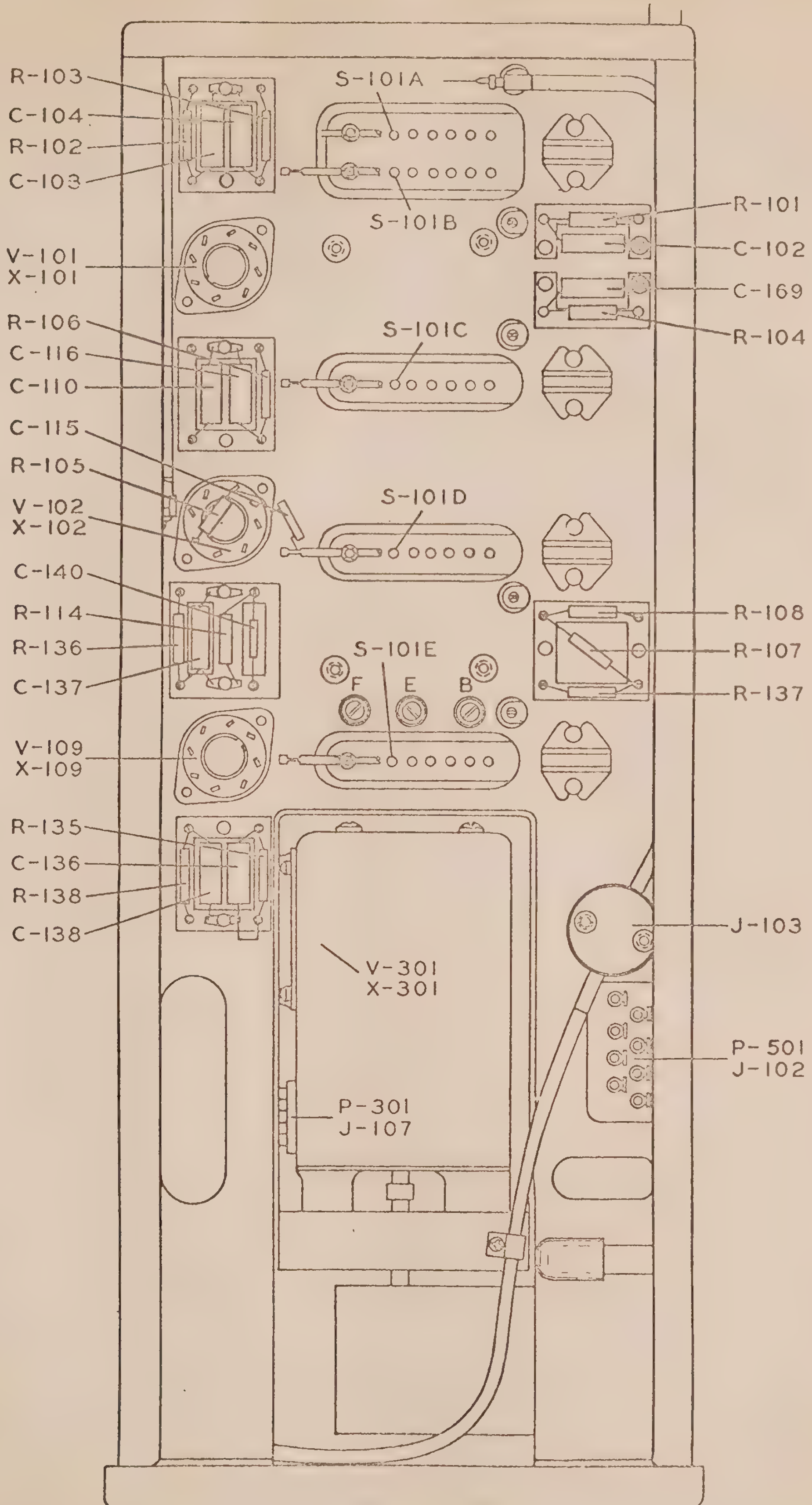


Figure 6-6. Receiver Parts Arrangement—Right Side

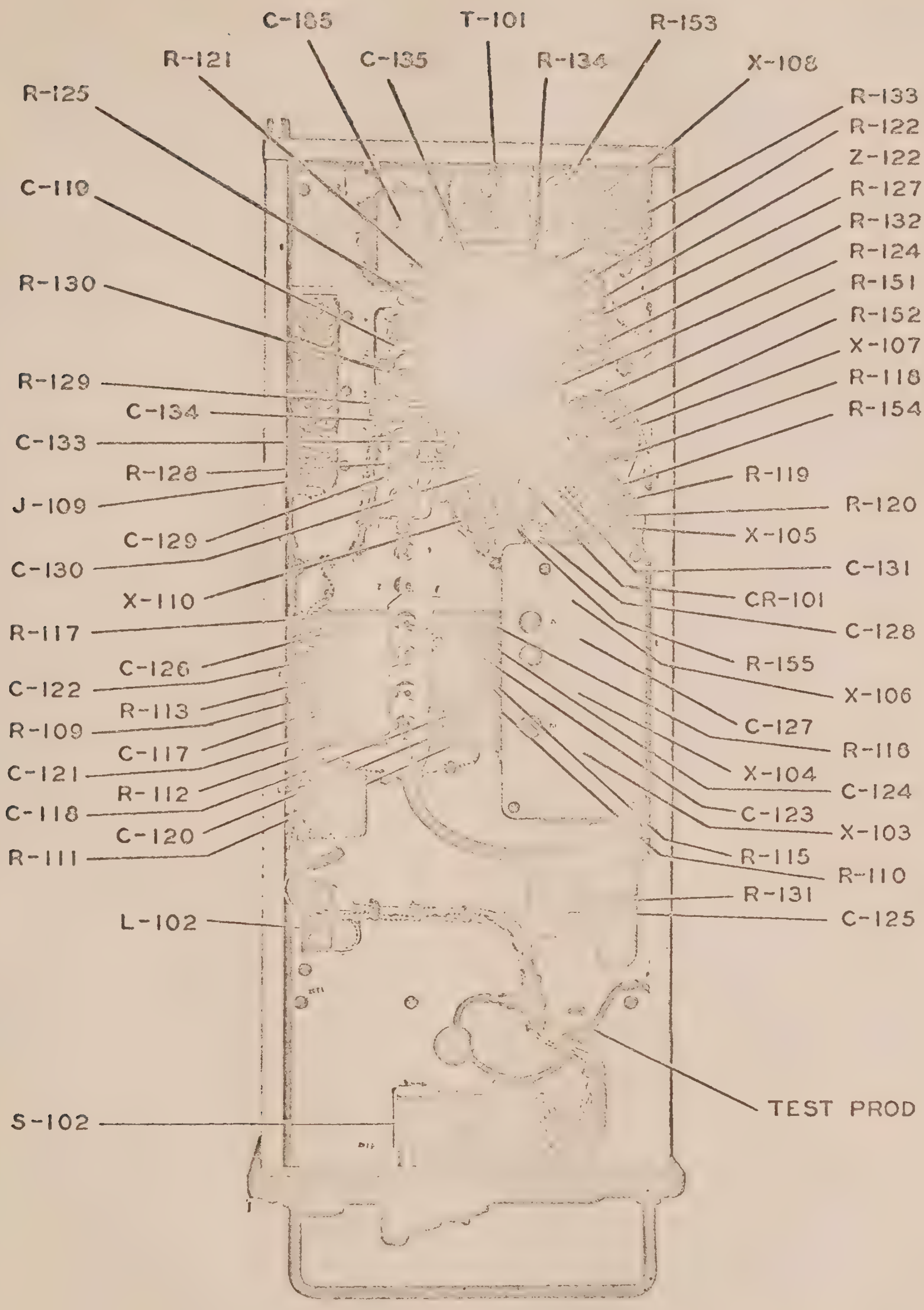


Figure 6-7. Receiver—Left Side

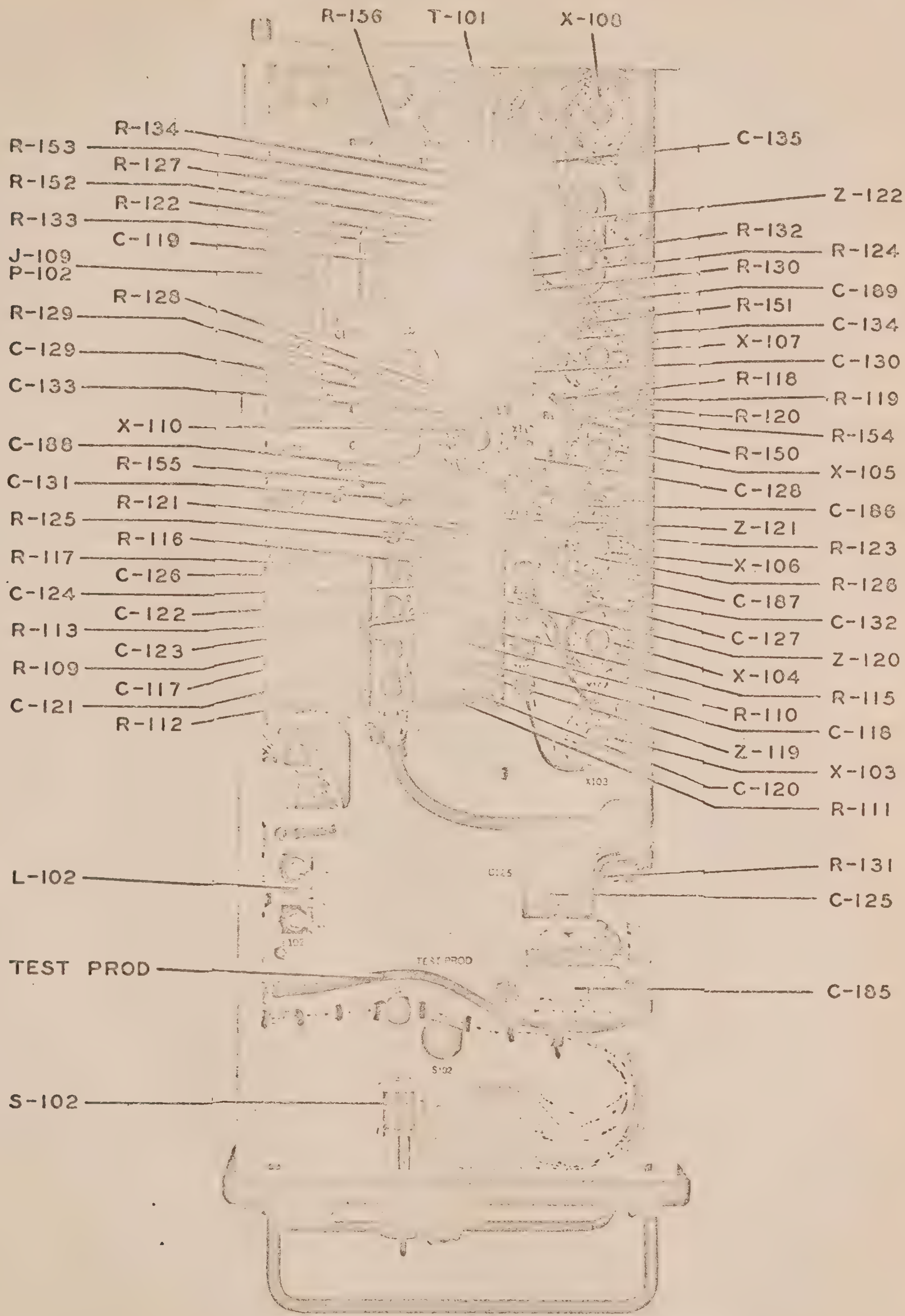


Figure 6-7A. R-105A/ARR-15 Receiver—Left Side

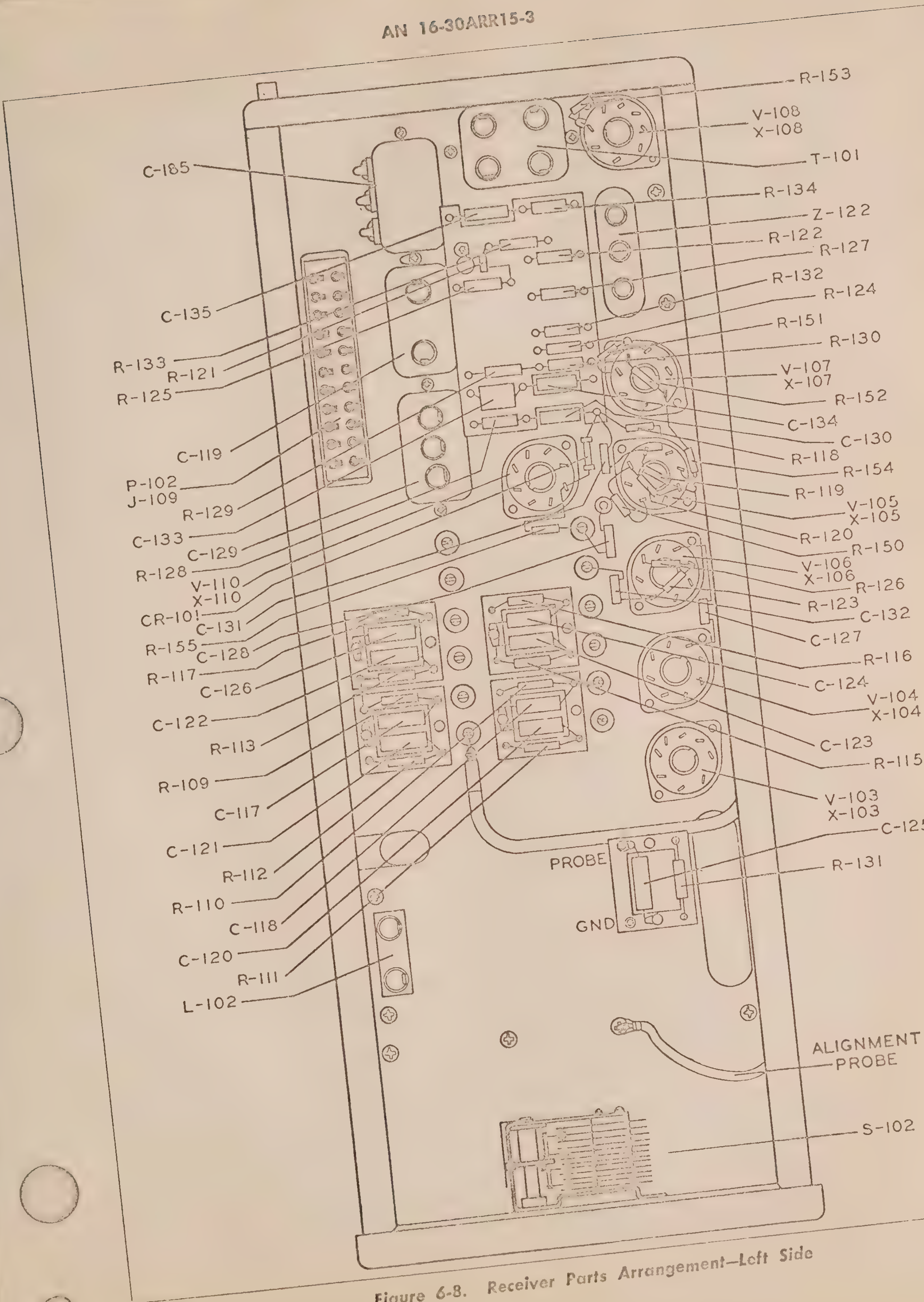


Figure 6-8. Receiver Parts Arrangement—Left Side

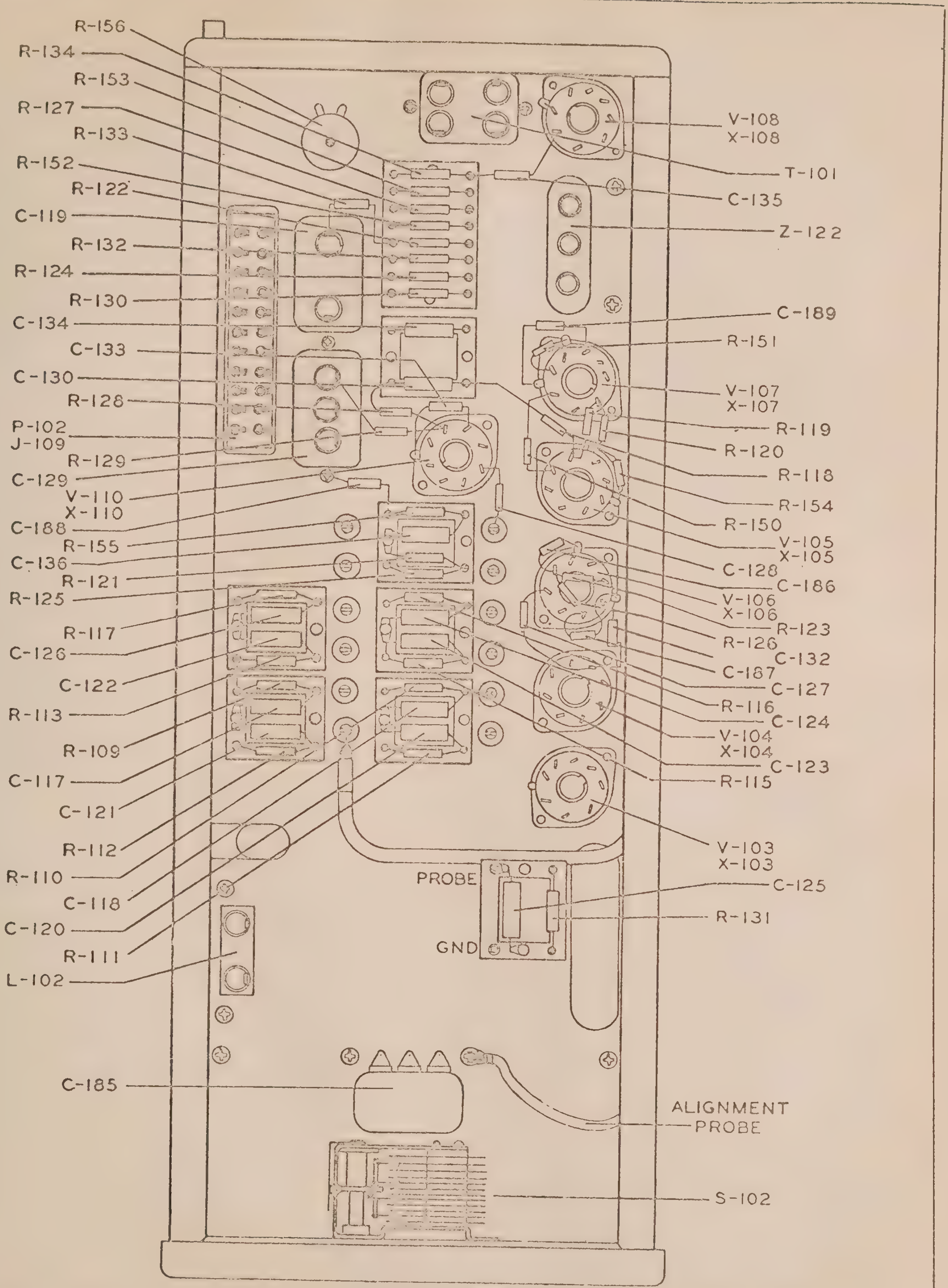


Figure 6-8A. R-105A/ARR-15 Receiver Parts Arrangement—Left Side

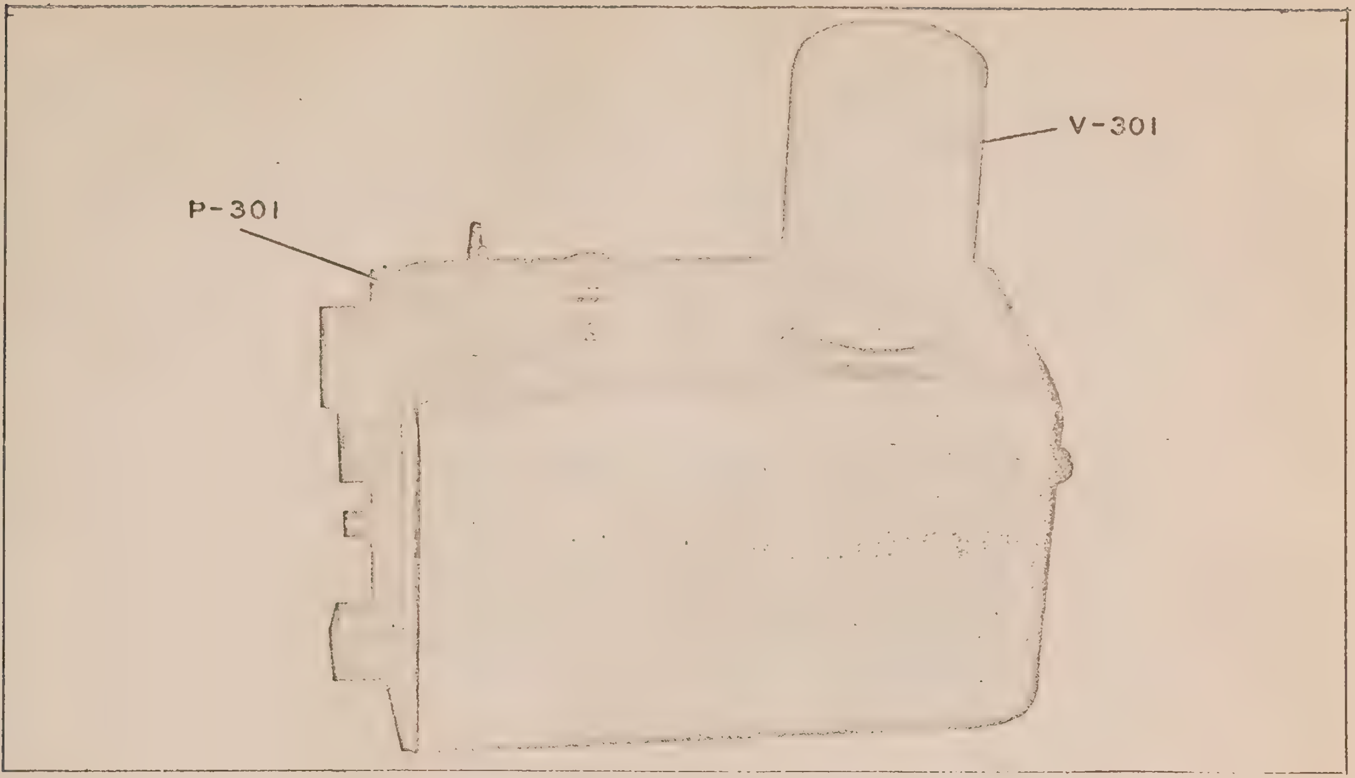


Figure 6-9. High Frequency Oscillator, Top Enclosed

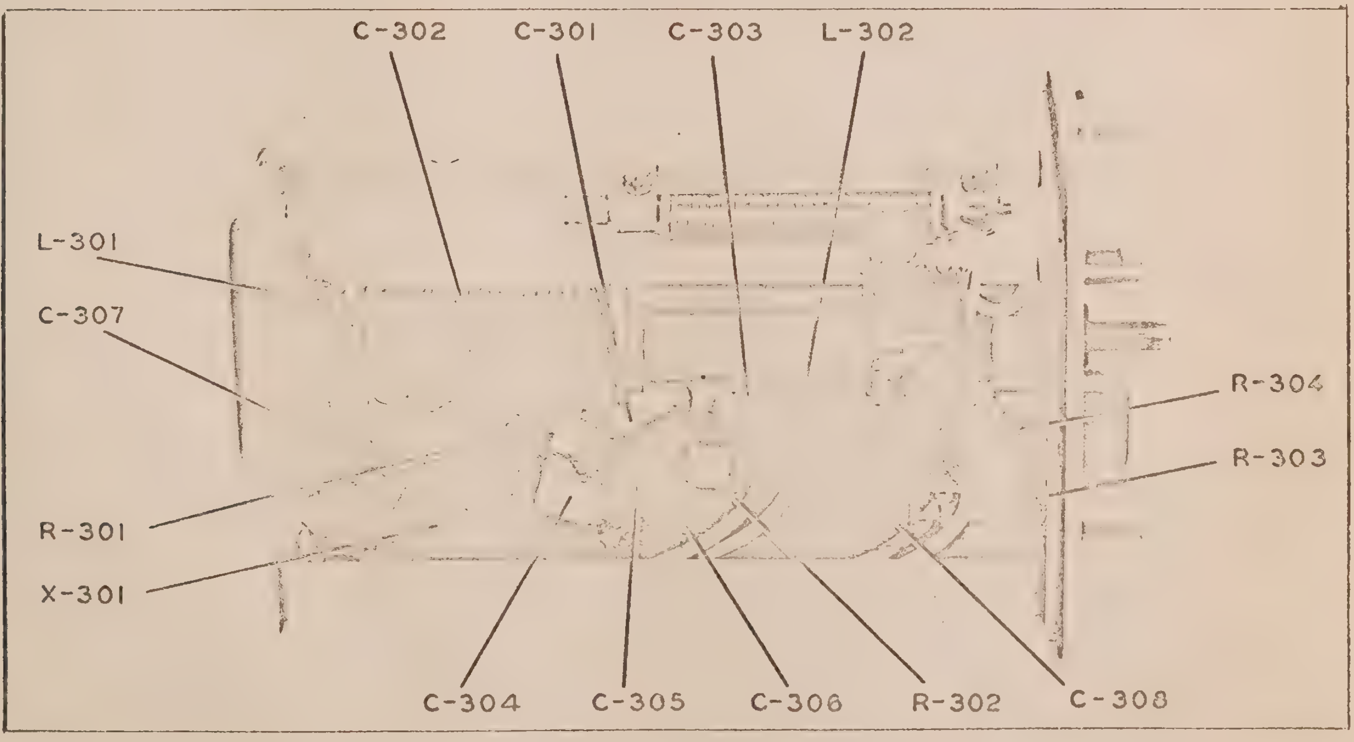


Figure 6-10. High Frequency Oscillator, Open

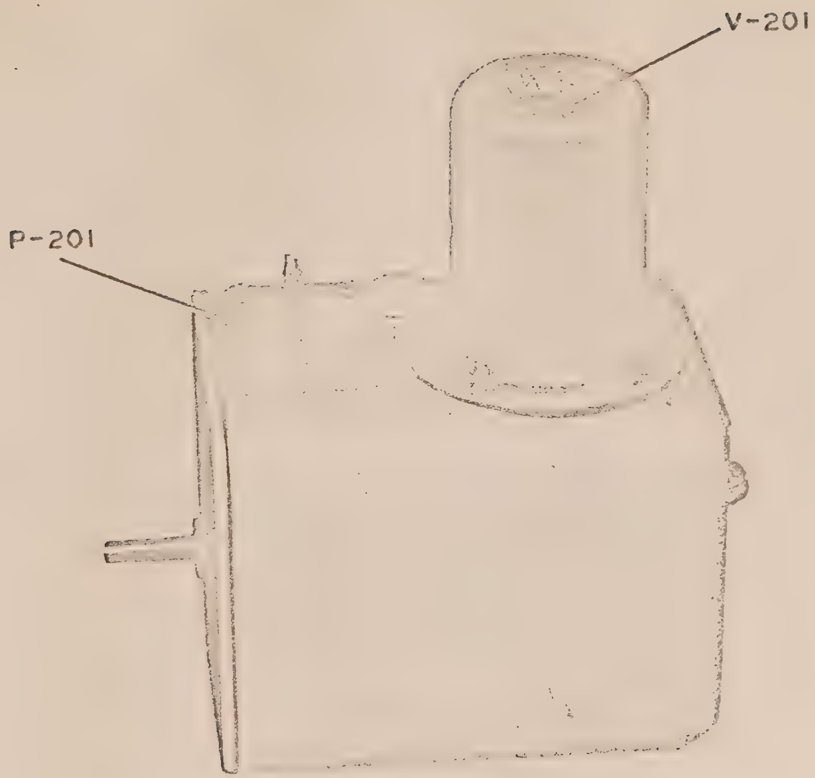


Figure 6-11. Low Frequency Oscillator, Top Enclosed

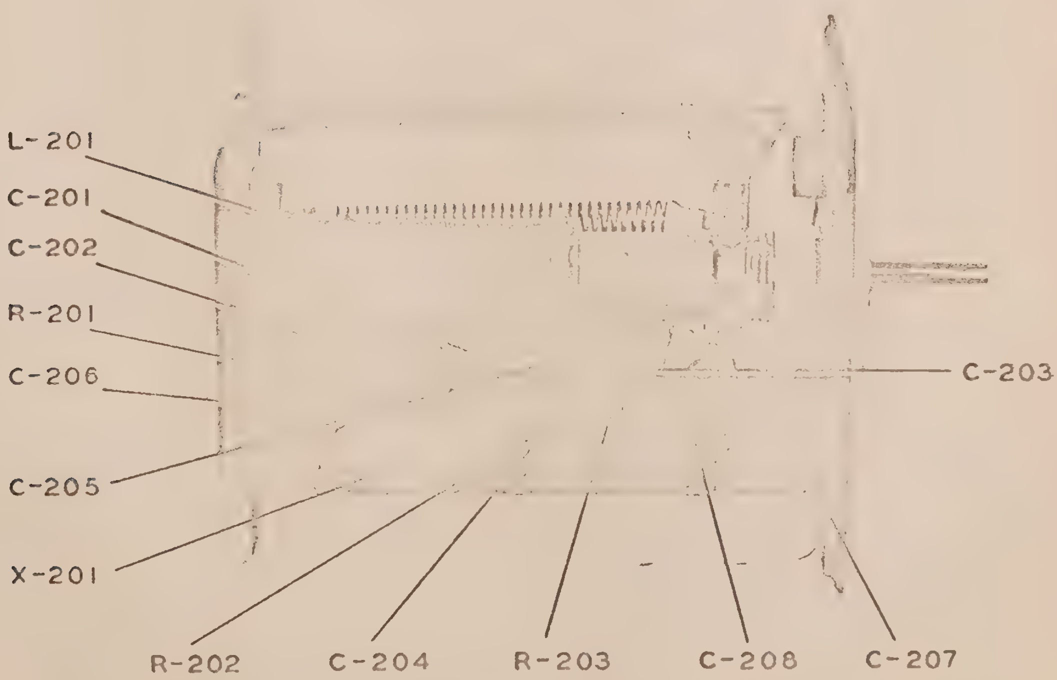


Figure 6-12. Low Frequency Oscillator, Open

Figure 6-13. Dynamotor Unit

Figure 6-14. CFI Unit, Enclosed

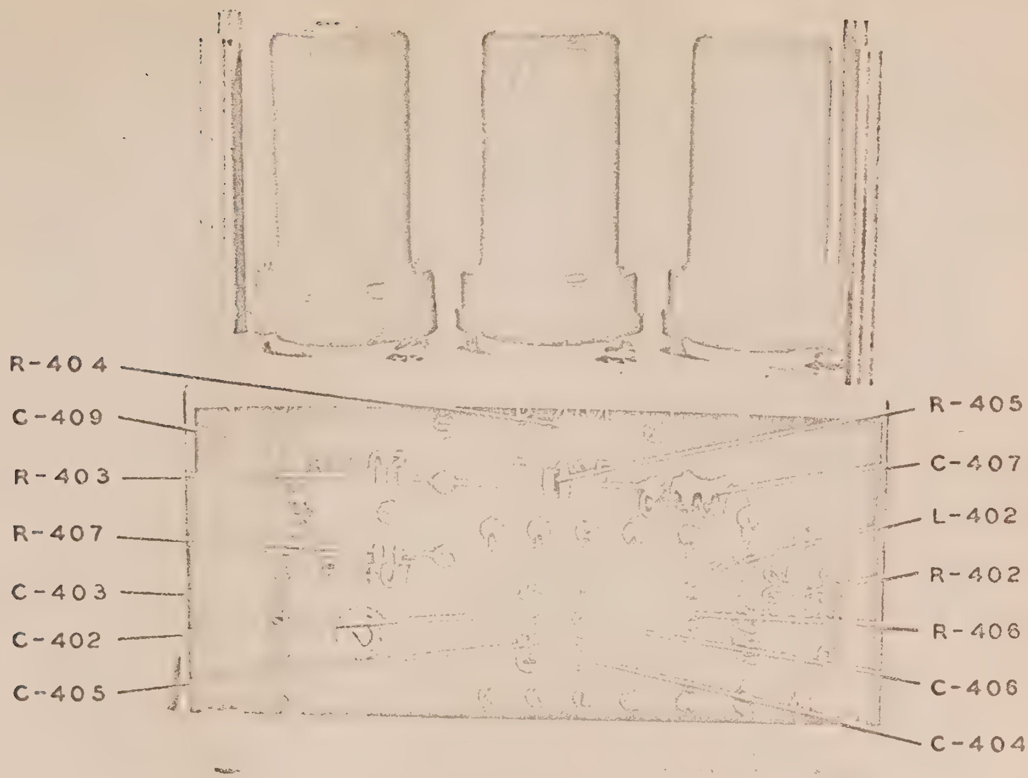


Figure 6-15. CFI Unit, Mounting Side

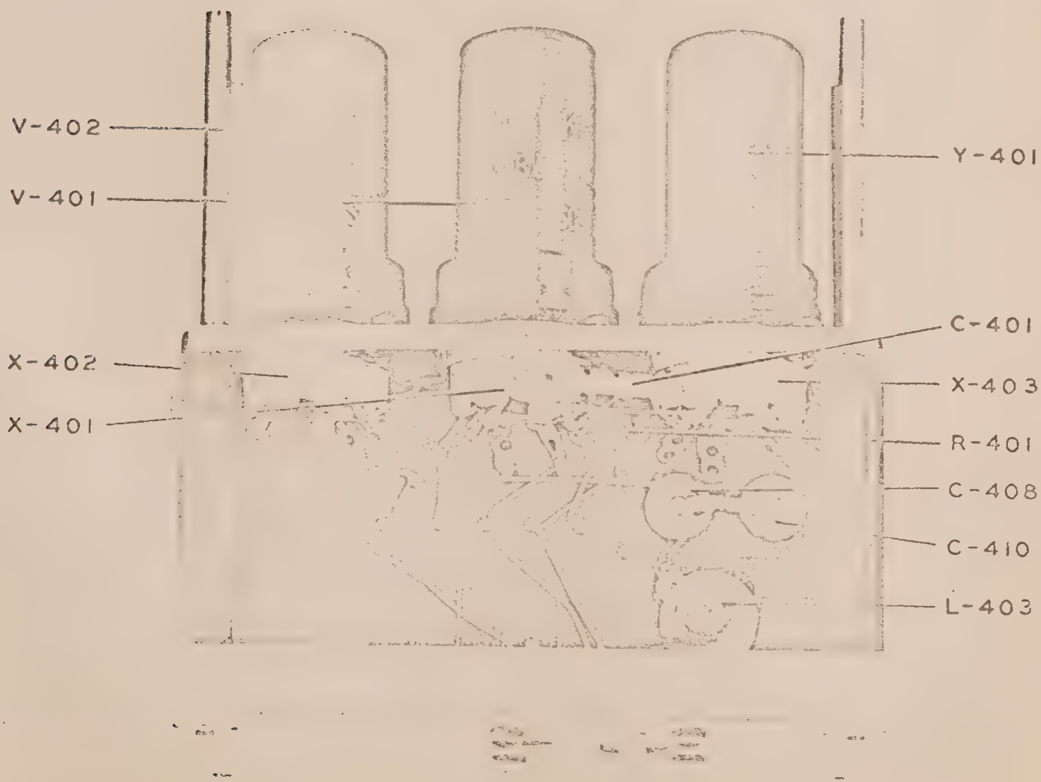


Figure 6-16. CFI Unit, Wired Side

Figure 6-17. Filter Unit, Bottom Enclosed

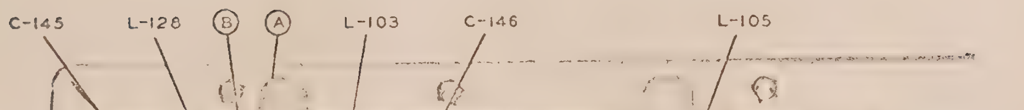


Figure 6-18. Filter Unit, Bottom Open

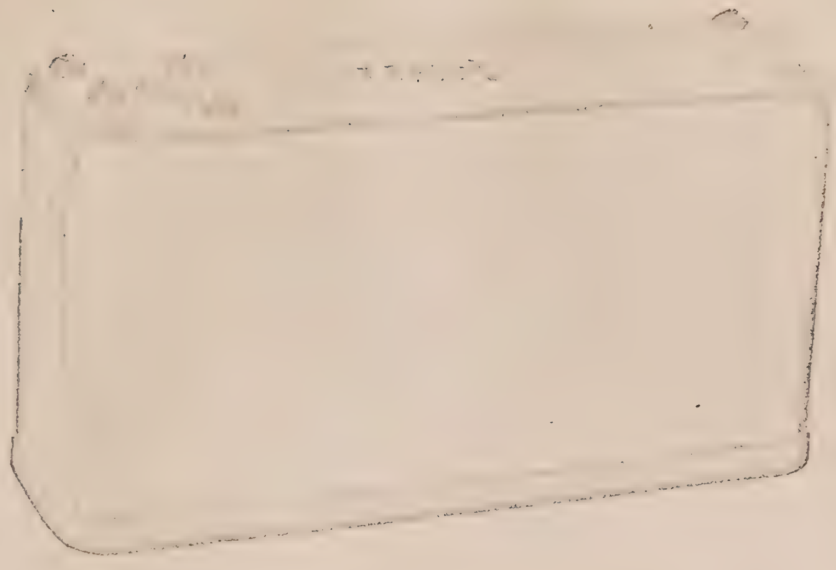


Figure 6-19. Relay Unit, Side Enclosed

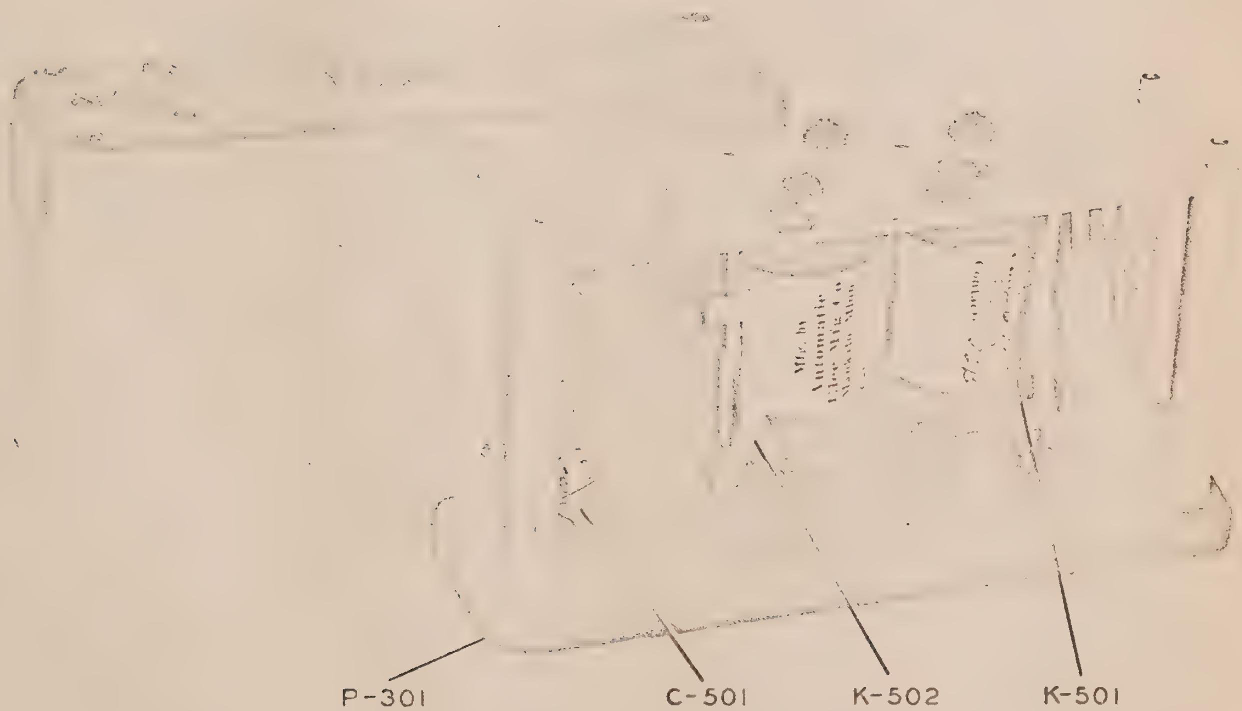


Figure 6-20. Relay Unit, Side Open

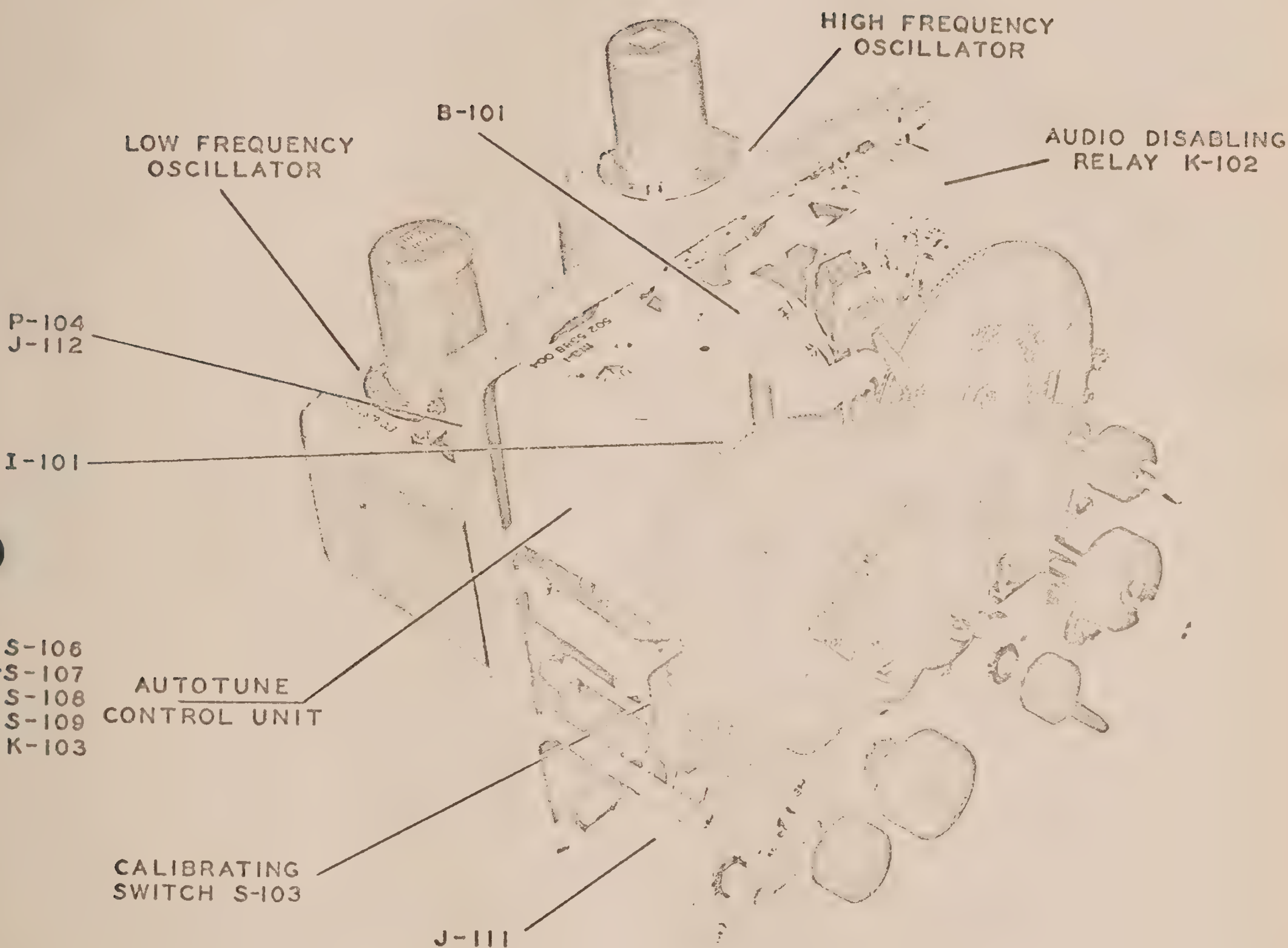


Figure 6-21. Autotune Casting Assembly—Top Left Oblique

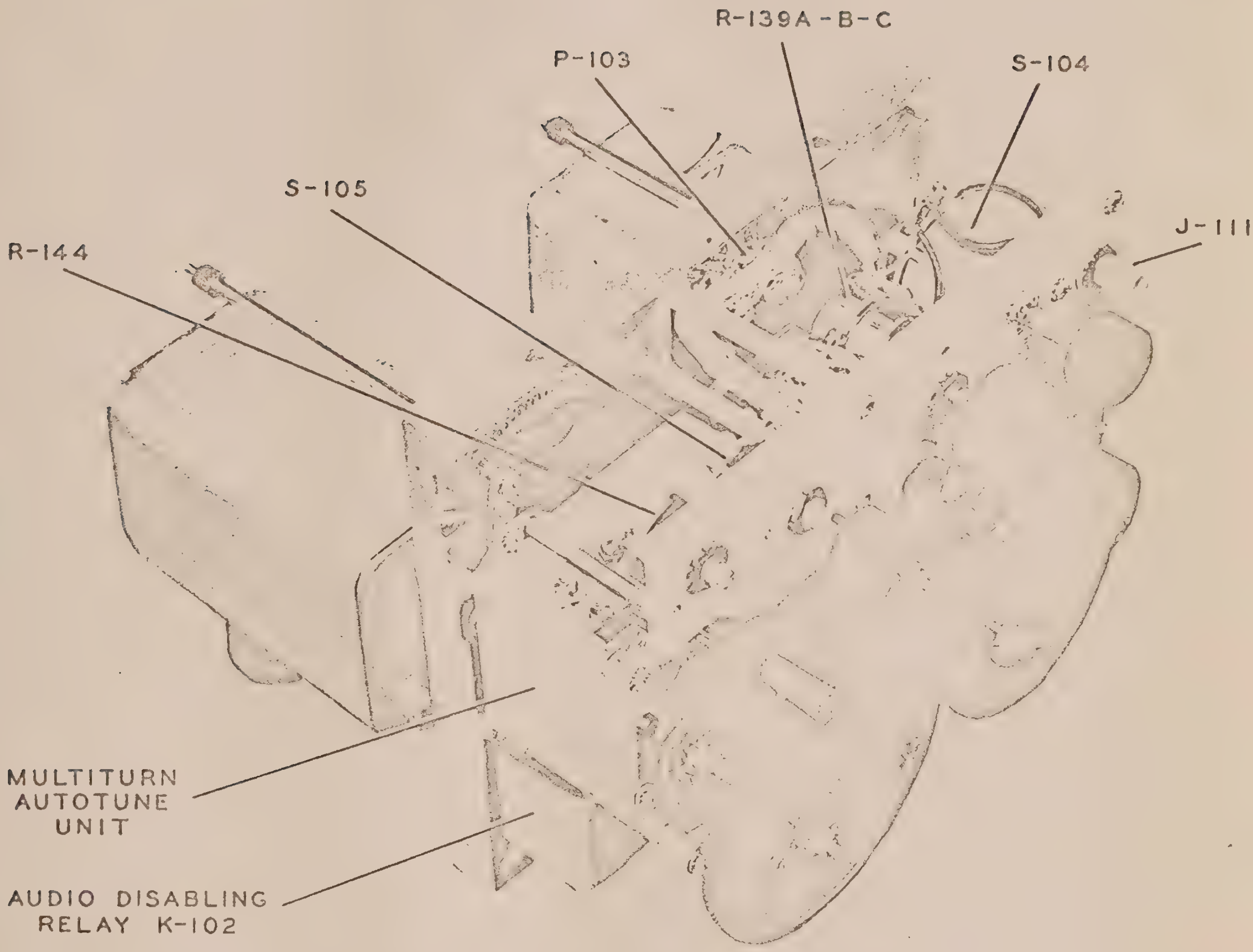


Figure 6-22. Autotune Casting Assembly—Bottom Right Oblique

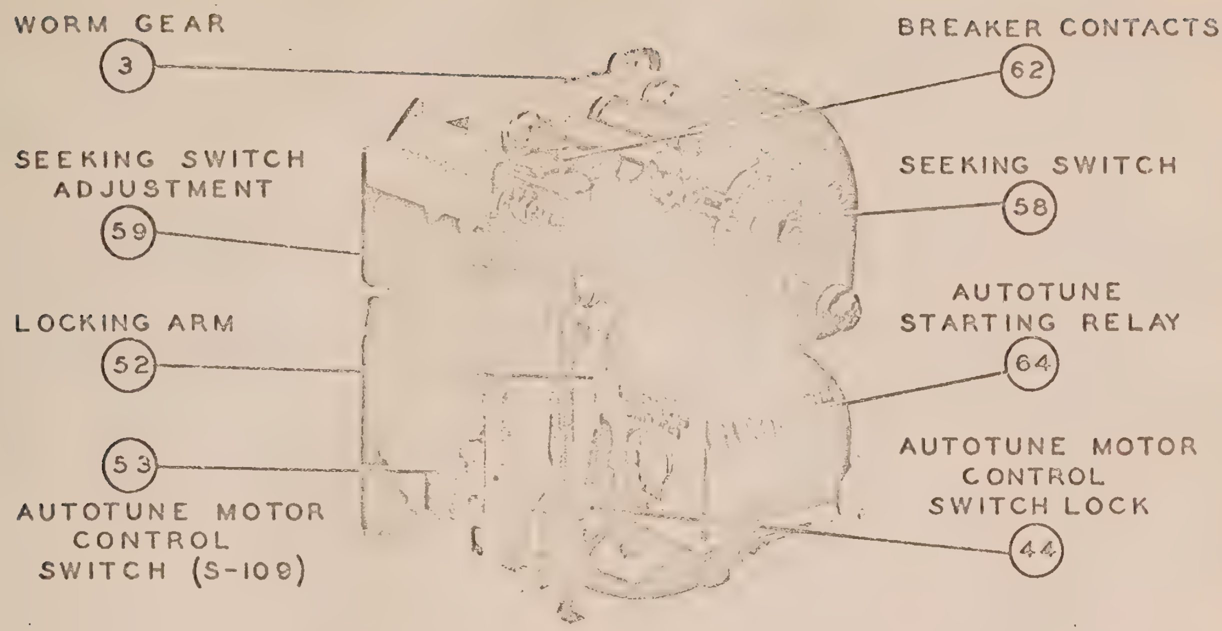


Figure 6-23. Autotune Control Unit, Front View

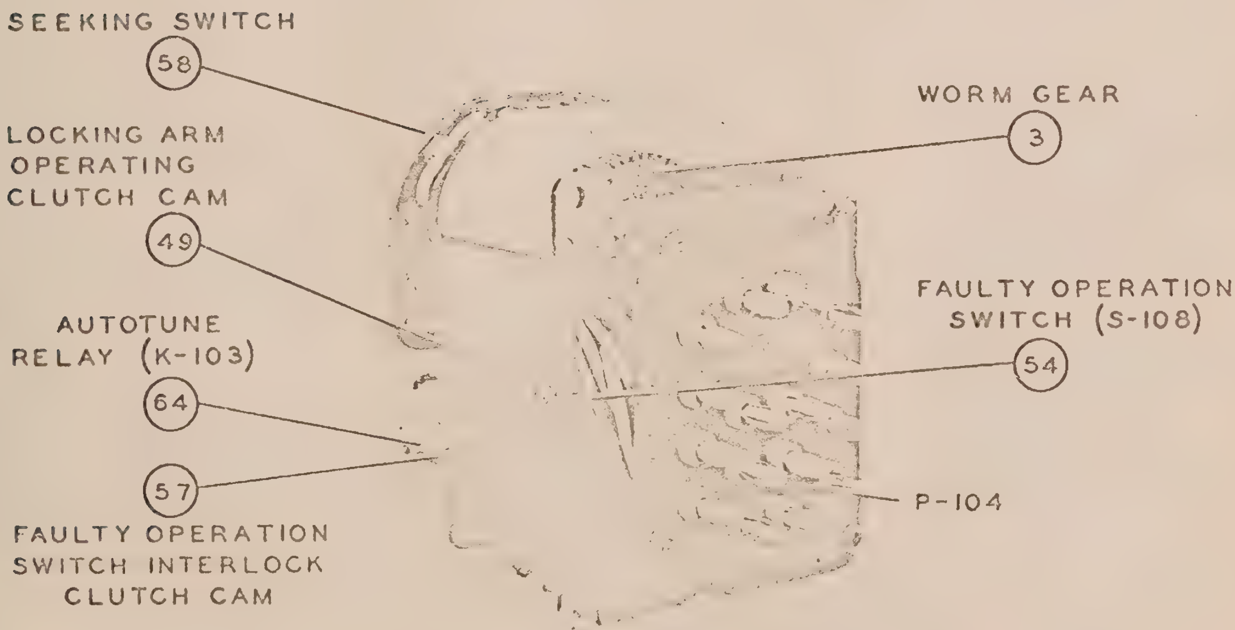
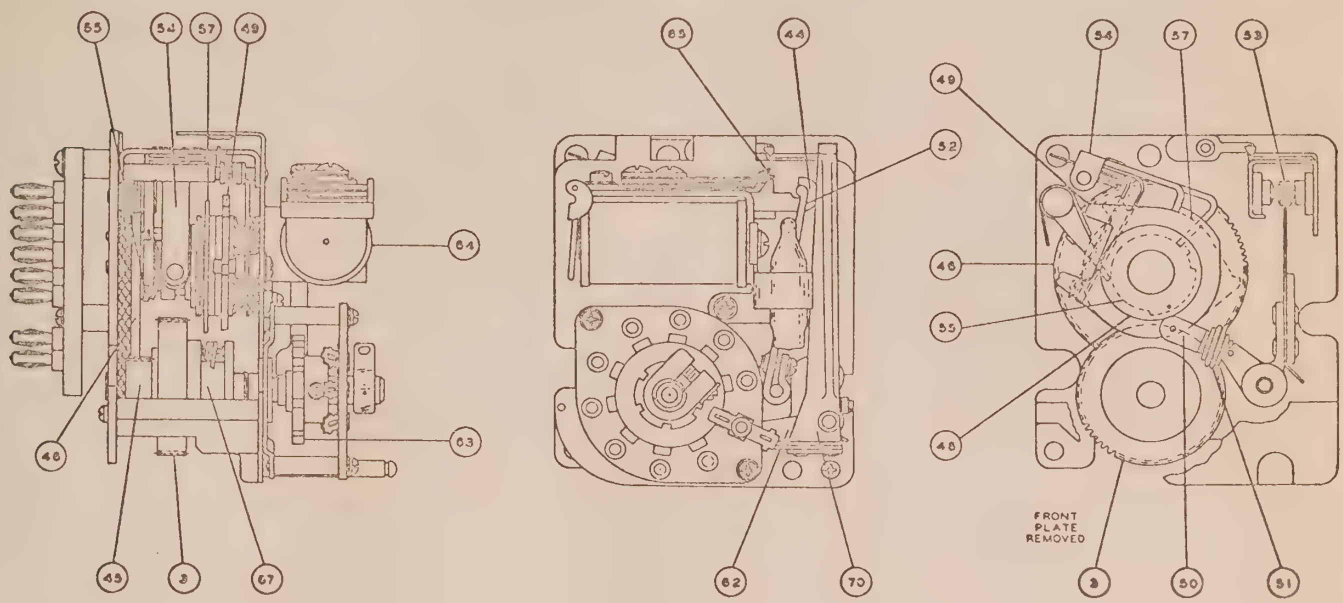


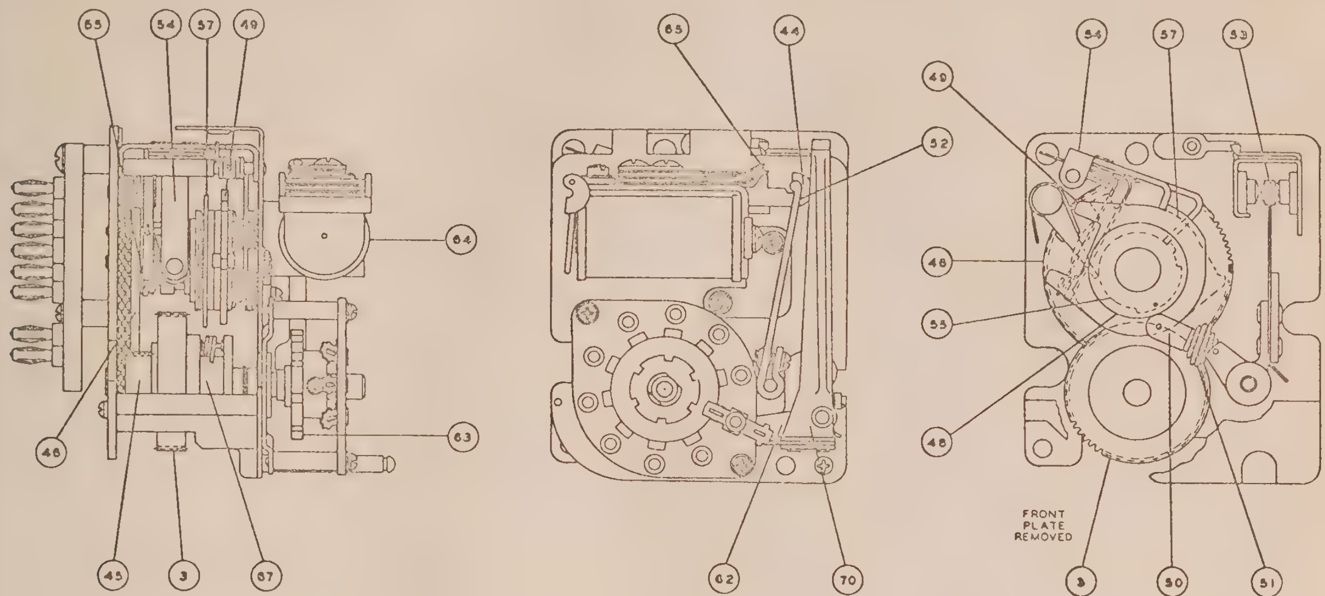
Figure 6-24. Autotune Control Unit, Rear View



KEY TO SYMBOLS FOR CONTROL UNIT, MULTITURN UNIT AND SINGLETURN UNIT

1. Line Shaft
2. Drive Worm
3. Worm Gear
4. Slip Clutch Drive Gear
5. Slip Clutch Idler Gear
6. Slip Clutch Spur Gear
7. Slip Clutch Band Dog
8. Slip Clutch Band
9. Slip Clutch Drum
10. Counter Drum Drive Gear
11. Counter Drum Idler Gear
12. Counter Drum Spur Gear
13. Planetary Drive Gear
14. Planetary Stationary Gear
15. Counter Drum Planetary Gear
16. Cam Drive Gear Assembly
17. Cam Drum Idler Gear
18. Cam Drum Spur Gear
19. Cam Drum Ratchet Dog
20. Cam Drum Ratchet Tooth
21. Cam Drum
22. Counter Drum Slot Ring
23. Counter Drum Slot Ring Pawl
    (23A—Pawl Heel)
    (23B—Pawl Tail)
    (23C—Pawl Toe)
24. Counter Drum Home Stop Gear
25. Home Stop Pawl Operating Gear
26. Pawl Lifting Lever
27. Pawl Lifting Toggle
28. Home Stop Ring
29. Home Stop Pawl
    (29A—Pawl Heel)
    (29B—Pawl Tail)
    (29C—Pawl Toe)
30. Stop Ring
31. Stop Ring Pawl
    (31A—Pawl Heel)
    (31B—Pawl Tail)
    (31C—Pawl Toe)
32. Pawl Spring
33. Stop Ring Drum Lock
34. Tuning Knob Shaft
35. Tuning Drive Gear
36. Tuning Drive Limit Spline
37. Tuning Idler Gear
38. Tuning Spur Gear
39. Tuning Spur Gear Clutch
40. Tuned Element
41. Stop Bar
42. Stop Ring Drum Drive
43. Cam Drum Drive Gear
44. Autotune Motor Control Switch Lock
45. Locking Arm Drive Gear
46. Locking Arm Spur Gear
47. Locking Arm Engage Collar
48. Locking Arm Operating Clutch Drum
49. Locking Arm Operating Clutch Cam
50. Locking Arm Operating Clutch Arm
51. Locking Arm Operating Clutch Arm Spring
52. Locking Arm
53. Autotune Motor Control Switch (S-109)
54. Faulty Operation Switch (S-108)
55. Faulty Operation Switch Cam
56. Faulty Operation Switch Interlock Arm
57. Faulty Operation Switch Interlock Clutch Cam
58. Seeking Switch (S-106)
59. Seeking Switch Adjustment
60. Seeking Switch Ratchet Dog
61. Seeking Switch Ratchet Tooth
62. Breaker Contacts (S-107)
63. Breaker Cam
64. Autotune Starting Relay
65. Autotune Starting Relay Contacts
66. Locking Arm Operating Clutch Spring
67. Single Tooth Ratchet Assembly
68. Seeking Switch Locking Collar
69. Neon Bulb (surge absorber)
70. Indicator Arm
71. Home Stop Anchor
72. Home Stop Pawl Push Rod
73. Home Stop Anchor Spring
74. Pawl Lifting Shaft
75. Actuator Lever
76. Toggle Spring

Figure 6-25. Control Unit Sections



KEY TO SYMBOLS FOR CONTROL UNIT, MULTITURN UNIT AND SINGLETURN UNIT

1. Line Shaft
2. Drive Worm
3. Worm Gear
4. Slip Clutch Drive Gear
5. Slip Clutch Idler Gear
6. Slip Clutch Spur Gear
7. Slip Clutch Band Dog
8. Slip Clutch Band
9. Slip Clutch Drum
10. Counter Drum Drive Gear
11. Counter Drum Idler Gear
12. Counter Drum Spur Gear
13. Planetary Drive Gear
14. Planetary Stationary Gear
15. Counter Drum Planetary Gear
16. Cam Drive Gear Assembly
17. Cam Drum Idler Gear
18. Cam Drum Spur Gear
19. Cam Drum Ratchet Dog
20. Cam Drum Ratchet Tooth
21. Cam Drum
22. Counter Drum Slot Ring
23. Counter Drum Slot Ring Pawl
    (23A—Pawl Heel)
    (23B—Pawl Tail)
    (23C—Pawl Toe)
24. Counter Drum Home Stop Gear
25. Home Stop Pawl Operating Gear
26. Pawl Lifting Lever
27. Pawl Lifting Toggle
28. Home Stop Ring
29. Home Stop Pawl
    (29A—Pawl Heel)
    (29B—Pawl Tail)
    (29C—Pawl Toe)
30. Stop Ring
31. Stop Ring Pawl
    (31A—Pawl Heel)
    (31B—Pawl Tail)
    (31C—Pawl Toe)
32. Pawl Spring
33. Stop Ring Drum Lock
34. Tuning Knob Shaft
35. Tuning Drive Gear
36. Tuning Drive Limit Spline
37. Tuning Idler Gear
38. Tuning Spur Gear
39. Tuning Spur Gear Clutch
40. Tuned Element
41. Stop Bar
42. Stop Ring Drum Drive
43. Cam Drum Drive Gear
44. Autotune Motor Control Switch Lock
45. Locking Arm Drive Gear
46. Locking Arm Spur Gear
47. Locking Arm Engage Collar
48. Locking Arm Operating Clutch Drum
49. Locking Arm Operating Clutch Cam
50. Locking Arm Operating Clutch Arm
51. Locking Arm Operating Clutch Arm Spring
52. Locking Arm
53. Autotune Motor Control Switch (S-109)
54. Faulty Operation Switch (S-108)
55. Faulty Operation Switch Cam
56. Faulty Operation Switch Interlock Arm
57. Faulty Operation Switch Interlock Clutch Cam
58. Seeking Switch (S-106)
59. Seeking Switch Adjustment
60. Seeking Switch Ratchet Dog
61. Seeking Switch Ratchet Tooth
62. Breaker Contacts (S-107)
63. Breaker Cam
64. Autotune Starting Relay
65. Autotune Starting Relay Contacts
66. Locking Arm Operating Clutch Spring
67. Single Tooth Ratchet Assembly
68. Seeking Switch Locking Collar
69. Neon Bulb (surge absorber)
70. Indicator Arm
71. Home Stop Anchor
72. Home Stop Pawl Push Rod
73. Home Stop Anchor Spring
74. Pawl Lifting Shaft
75. Actuator Lever
76. Toggle Spring

Figure 6-25A. AN/ARR-15A Control Unit, Sections

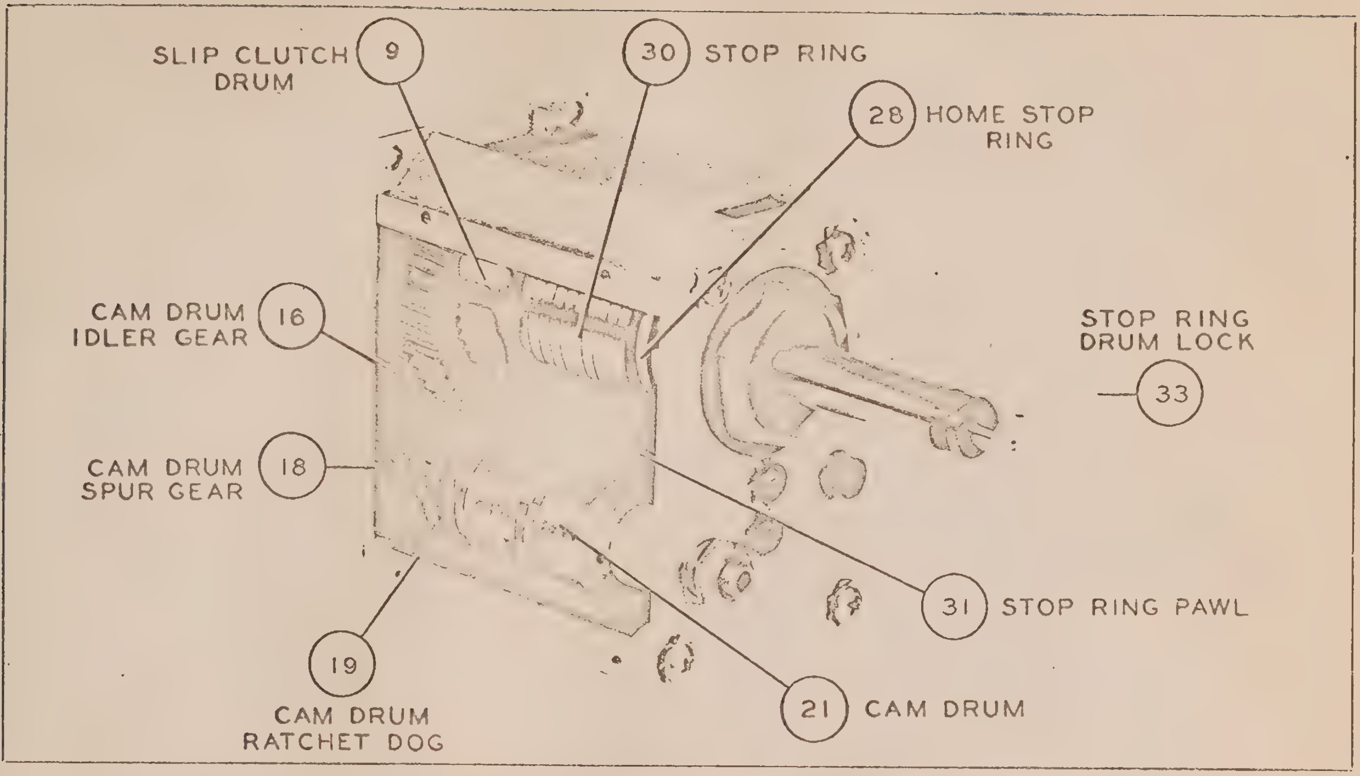


Figure 6-26. Singleturn Unit, Front View

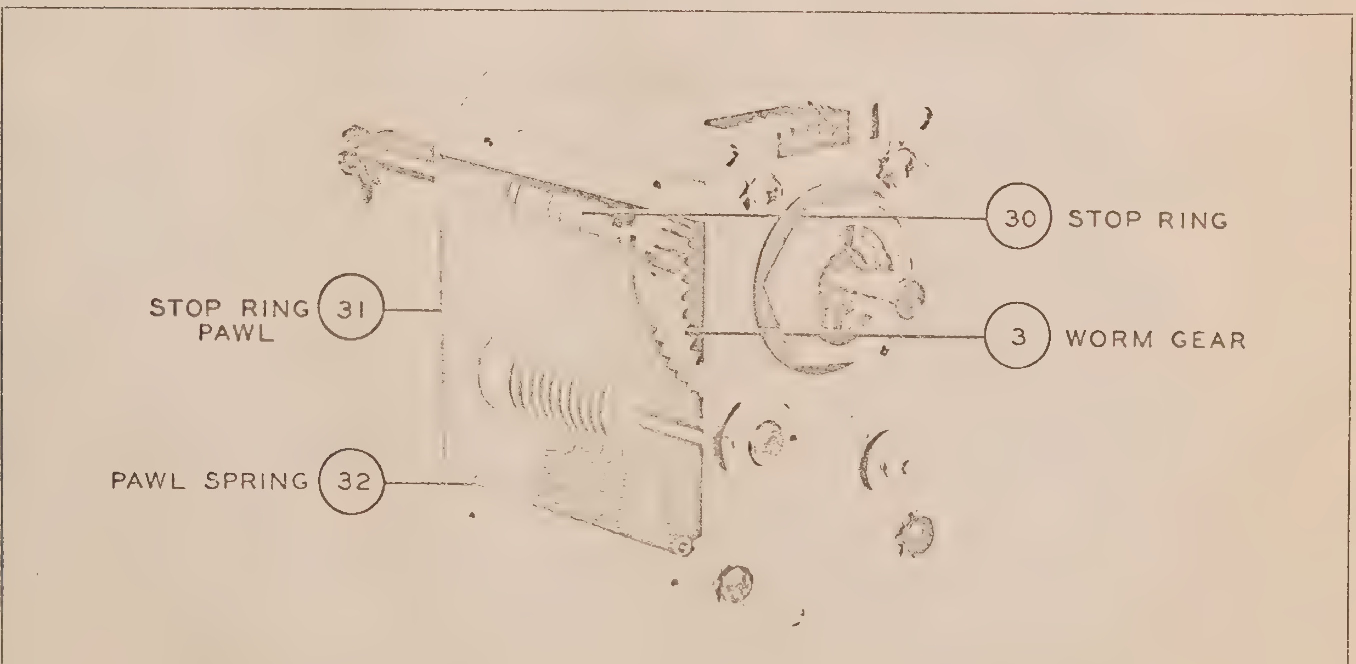
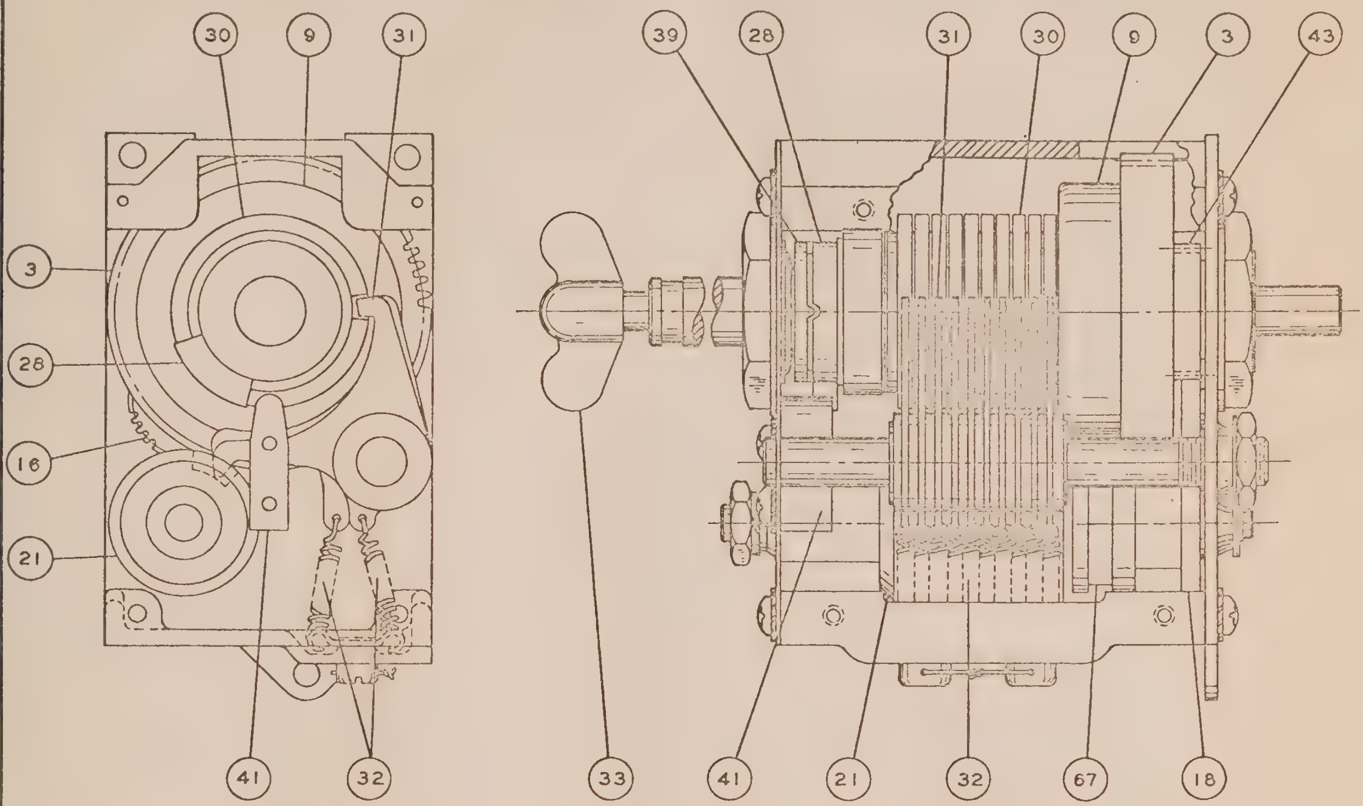


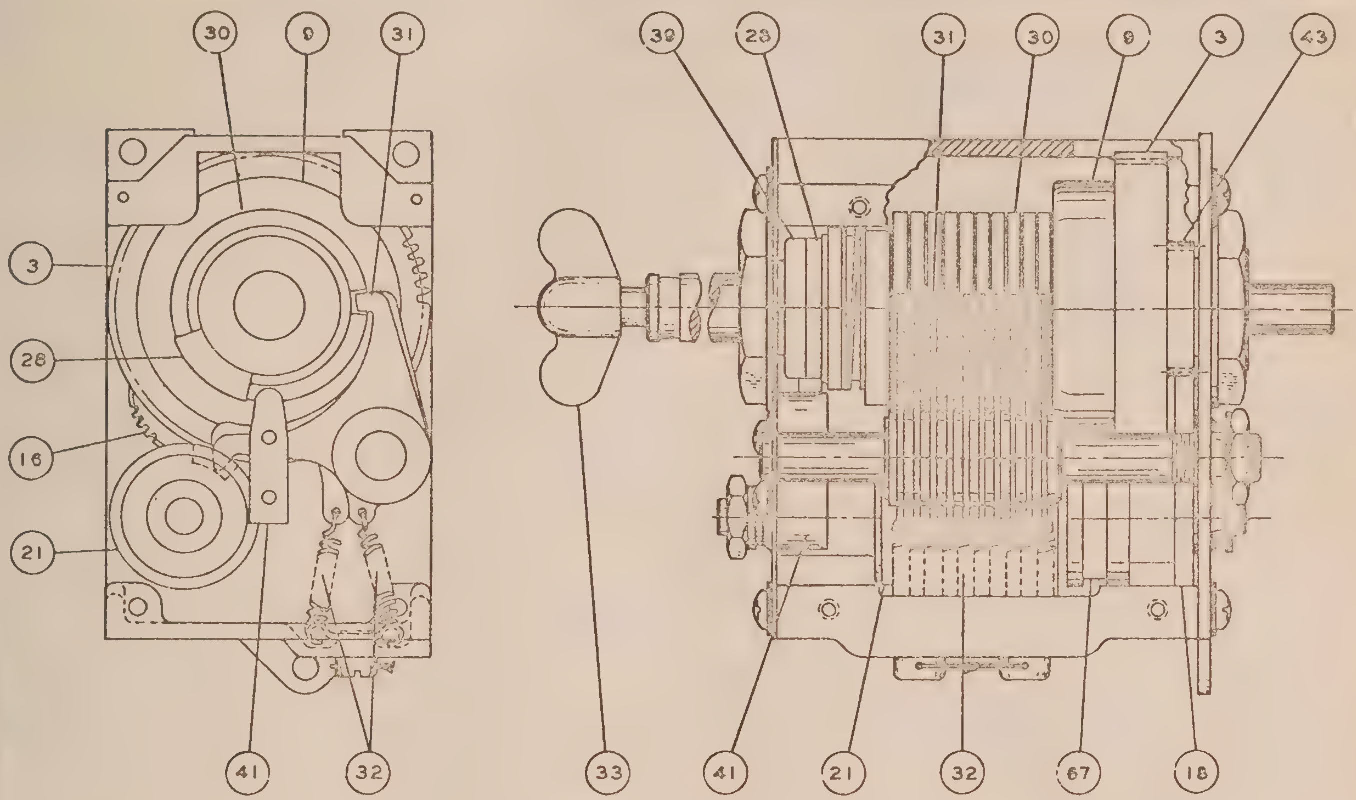
Figure 6-27. Singleturn Unit, Rear View



KEY TO SYMBOLS

1. Line Shaft
2. Drive Worm
3. Worm Gear
4. Slip Clutch Drive Gear
5. Slip Clutch Idler Gear
6. Slip Clutch Spur Gear
7. Slip Clutch Band Dog
8. Slip Clutch Band
9. Slip Clutch Drum
10. Counter Drum Drive Gear
11. Counter Drum Idler Gear
12. Counter Drum Spur Gear
13. Planetary Drive Gear
14. Planetary Stationary Gear
15. Counter Drum Planetary Gear
16. Cam Drive Gear Assembly
17. Cam Drum Idler Gear
18. Cam Drum Spur Gear
19. Cam Drum Ratchet Dog
20. Cam Drug Ratchet Tooth
21. Cam Drum
22. Counter Drum Slot Ring
23. Counter Drum Slot Ring Pawl
    (23A—Pawl Heel)
    (23B—Pawl Tail)
    (23C—Pawl Toe)
24. Counter Drum Home Stop Gear
25. Home Stop Pawl Operating Gear
26. Pawl Lifting Lever
27. Pawl Lifting Toggle
28. Home Stop Ring
29. Home Stop Pawl
    (29A—Pawl Heel)
    (29B—Pawl Tail)
    (29C—Pawl Toe)
30. Stop Ring
31. Stop Ring Pawl
    (31A—Pawl Heel)
    (31B—Pawl Tail)
    (31C—Pawl Toe)
32. Pawl Spring
33. Stop Ring Drum Lock
34. Tuning Knob Shaft
35. Tuning Drive Gear
36. Tuning Drive Limit Spline
37. Tuning Idler Gear
38. Tuning Spur Gear
39. Tuning Spur Gear Clutch
40. Tuned Element
41. Stop Bar
42. Stop Ring Drum Drive
43. Cam Drum Drive Gear

Figure 6-28. Singleturn Unit, Sections



KEY TO SYMBOLS

1. Line Shaft
2. Drive Worm
3. Worm Gear
4. Slip Clutch Drive Gear
5. Slip Clutch Idler Gear
6. Slip Clutch Spur Gear
7. Slip Clutch Band Dog
8. Slip Clutch Band
9. Slip Clutch Drum
10. Counter Drum Drive Gear
11. Counter Drum Idler Gear
12. Counter Drum Spur Gear
13. Planetary Drive Gear
14. Planetary Stationary Gear
15. Counter Drum Planetary Gear
16. Cam Drive Gear Assembly
17. Cam Drum Idler Gear
18. Cam Drum Spur Gear
19. Cam Drum Ratchet Dog
20. Cam Drum Ratchet Tooth
21. Cam Drum
22. Counter Drum Slot Ring
23. Counter Drum Slot Ring Pawl
    (23A—Pawl Heel)
    (23B—Pawl Tail)
    (23C—Pawl Toe)
24. Counter Drum Home Stop Gear
25. Home Stop Pawl Operating Gear
26. Pawl Lifting Lever
27. Pawl Lifting Toggle
28. Home Stop Ring
29. Home Stop Pawl
    (29A—Pawl Heel)
    (29B—Pawl Tail)
    (29C—Pawl Toe)
30. Stop Ring
31. Stop Ring Pawl
    (31A—Pawl Heel)
    (31B—Pawl Tail)
    (31C—Pawl Toe)
32. Pawl Spring
33. Stop Ring Drum Lock
34. Tuning Knob Shaft
35. Tuning Drive Gear
36. Tuning Drive Limit Spline
37. Tuning Idler Gear
38. Tuning Spur Gear
39. Tuning Spur Gear Clutch
40. Tuned Element
41. Stop Bar
42. Stop Ring Drum Drive
43. Cam Drum Drive Gear

Figure 6-28A. AN/ARR-15A Singleturn Unit, Sections

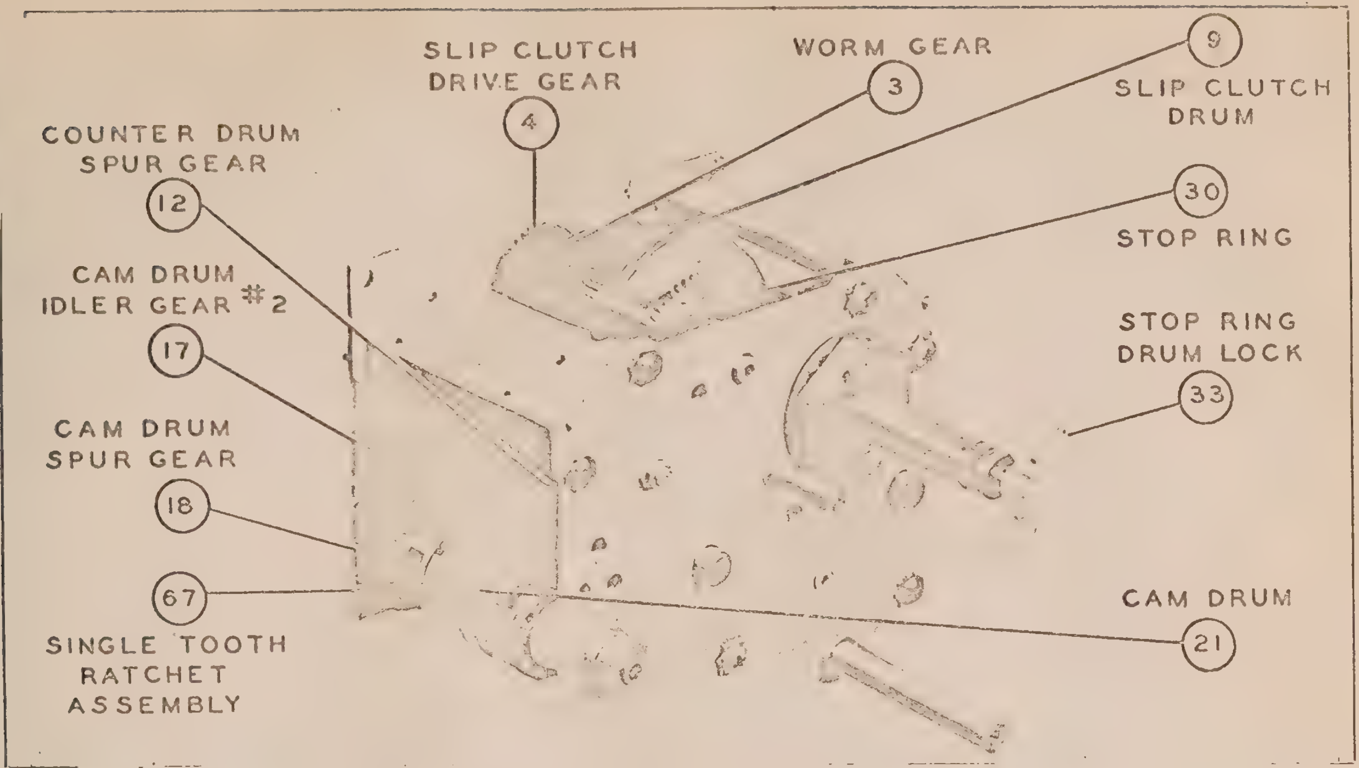


Figure 6-29. Multiturn Unit, Front

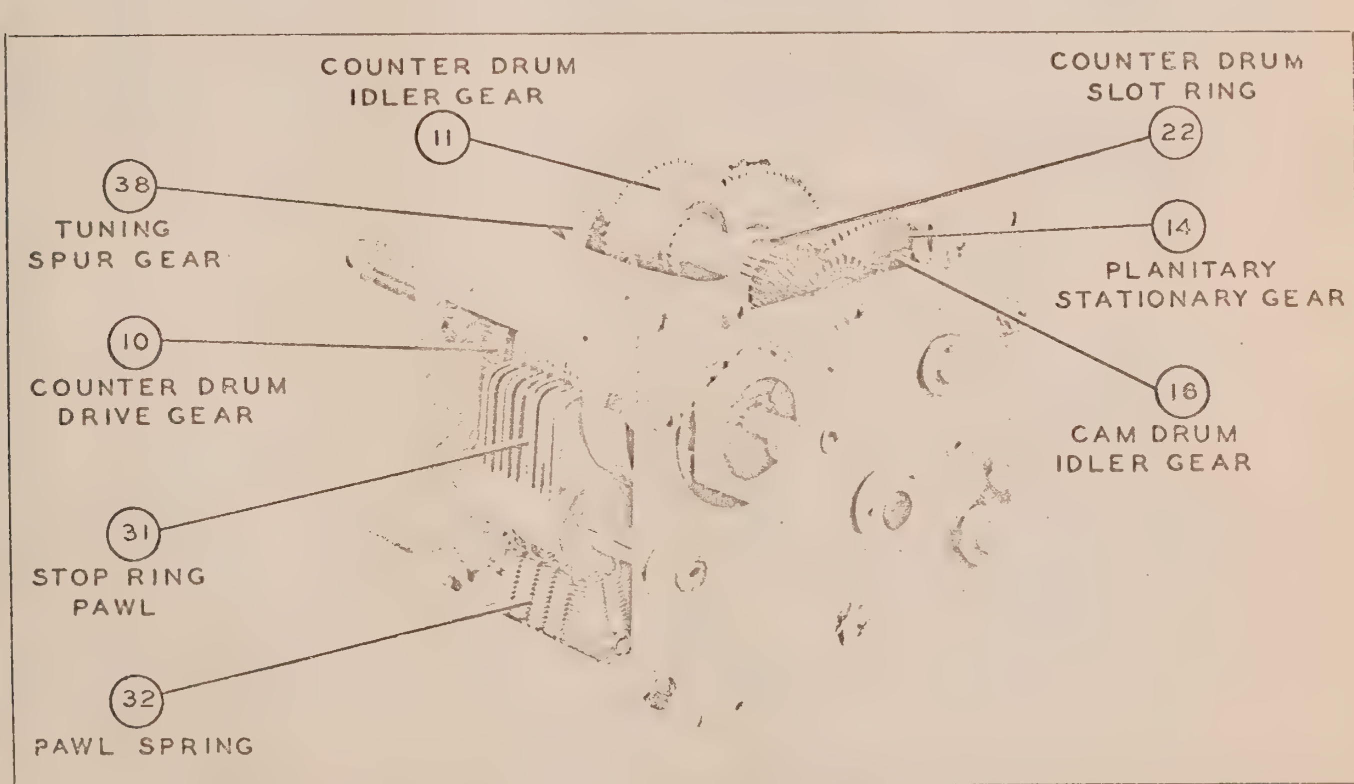
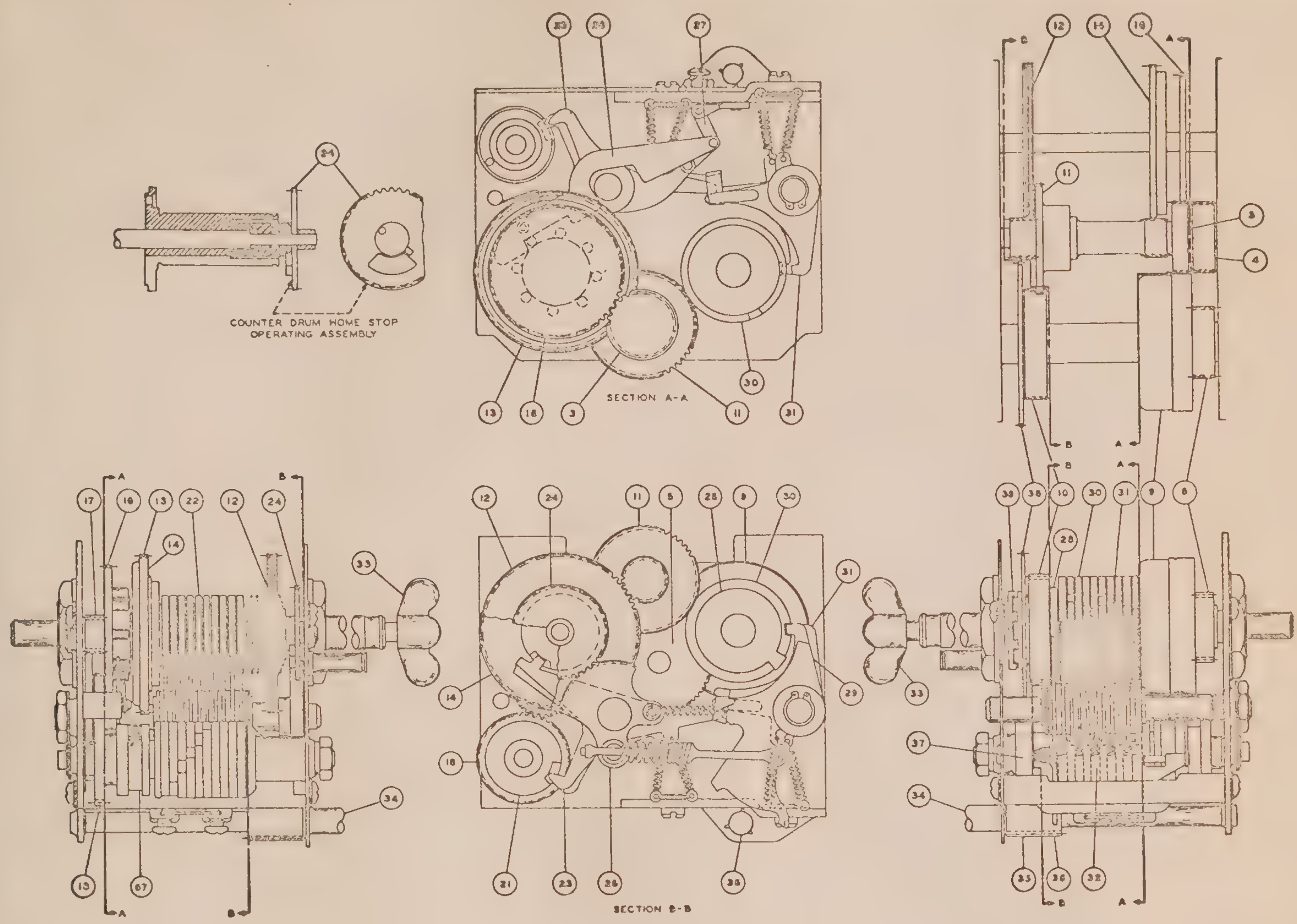


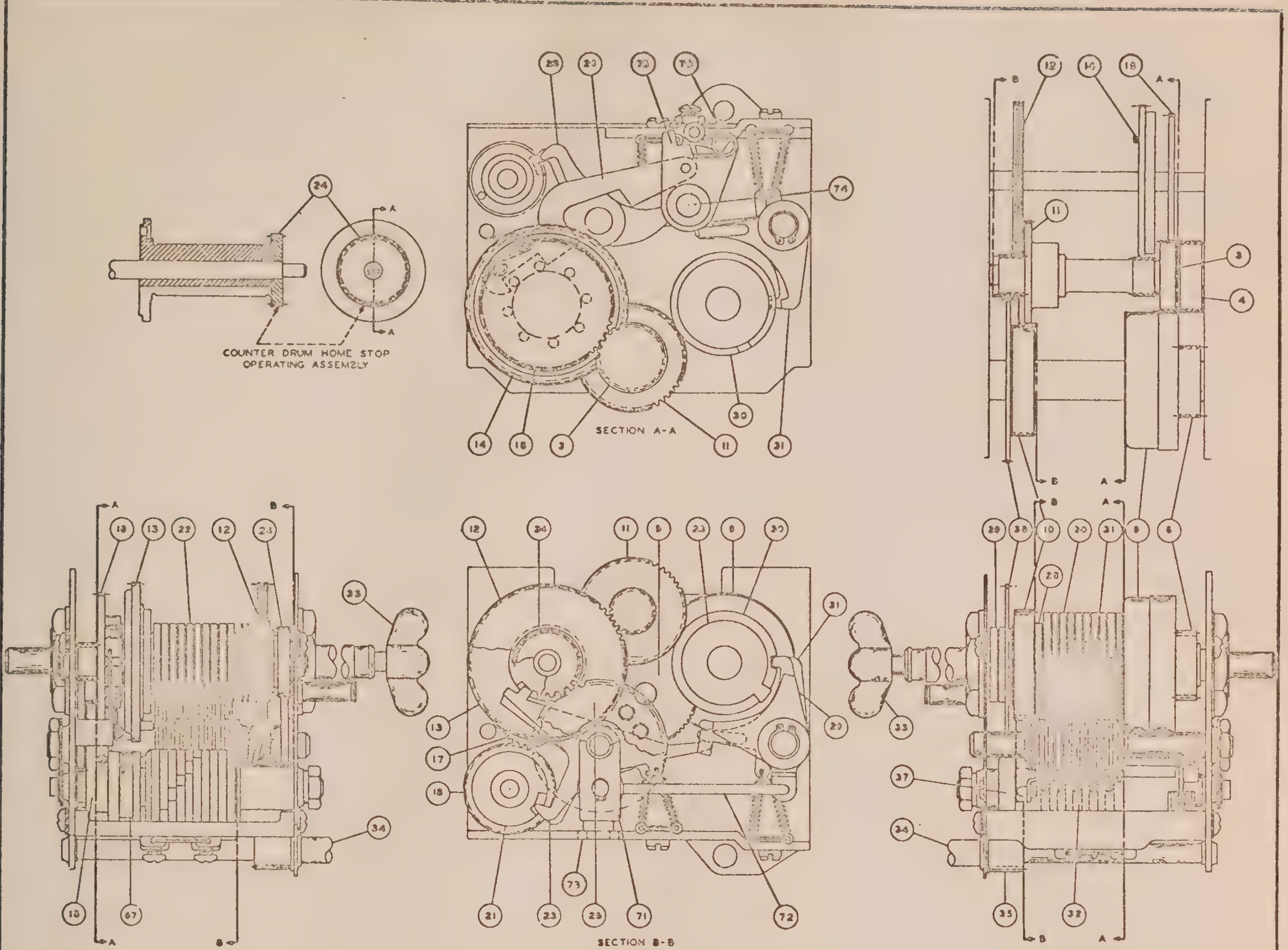
Figure 6-30. Multiturn Unit, Rear



KEY TO SYMBOLS

1. Line Shaft
2. Drive Worm
3. Worm Gear
4. Slip Clutch Drive Gear
5. Slip Clutch Idler Gear
6. Slip Clutch Spur Gear
7. Slip Clutch Band Dog
8. Slip Clutch Band
9. Slip Clutch Drum
10. Counter Drum Drive Gear
11. Counter Drum Idler Gear
12. Counter Drum Spur Gear
13. Planetary Drive Gear
14. Planetary Stationary Gear
15. Counter Drum Planetary Gear
16. Cam Drive Gear Assembly
17. Cam Drum Idler Gear
18. Cam Drum Spur Gear
19. Cam Drum Ratchet Dog
20. Cam Drum Ratchet Tooth
21. Cam Drum
22. Counter Drum Slot Ring
23. Counter Drum Slot Ring Pawl
    (23A—Pawl Heel)
    (23B—Pawl Tail)
    (23C—Pawl Toe)
24. Counter Drum Home Stop Gear
25. Home Stop Pawl Operating Gear
26. Pawl Lifting Lever
27. Pawl Lifting Toggle
28. Home Stop Ring
29. Home Stop Pawl
    (29A—Pawl Heel)
    (29B—Pawl Tail)
    (29C—Pawl Toe)
30. Stop Ring
31. Stop Ring Pawl
    (31A—Pawl Heel)
    (31B—Pawl Tail)
    (31C—Pawl Toe)
32. Pawl Spring
33. Stop Ring Drum Lock
34. Tuning Knob Shaft
35. Tuning Drive Gear
36. Tuning Drive Limit Spline
37. Tuning Idler Gear
38. Tuning Spur Gear
39. Tuning Spur Gear Clutch
40. Tuned Element
41. Stop Bar
42. Stop Ring Drum Drive
43. Cam Drum Drive Gear

Figure 6-31. Multiturn Unit, Sections



KEY TO SYMBOLS

1. Line Shaft
2. Drive Worm
3. Worm Gear
4. Slip Clutch Drive Gear
5. Slip Clutch Idler Gear
6. Slip Clutch Spur Gear
7. Slip Clutch Band Dog
8. Slip Clutch Band
9. Slip Clutch Drum
10. Counter Drum Drive Gear
11. Counter Drum Idler Gear
12. Counter Drum Spur Gear
13. Planetary Drive Gear
14. Planetary Stationary Gear
15. Counter Drum Planetary Gear
16. Cam Drive Gear Assembly
17. Cam Drum Idler Gear
18. Cam Drum Spur Gear
19. Cam Drum Ratchet Dog
20. Cam Drum Ratchet Tooth
21. Cam Drum
22. Counter Drum Slot Ring
23. Counter Drum Slot Ring Pawl
    (23A—Pawl Heel)
    (23B—Pawl Tail)
    (23C—Pawl Toe)
24. Counter Drum Home Stop Gear
25. Home Stop Pawl Operating Gear
26. Pawl Lifting Lever
27. Pawl Lifting Toggle
28. Home Stop Ring
29. Home Stop Pawl
    (29A—Pawl Heel)
    (29B—Pawl Tail)
    (29C—Pawl Toe)
30. Stop Ring
31. Stop Ring Pawl
    (31A—Pawl Heel)
    (31B—Pawl Tail)
    (31C—Pawl Toe)
32. Pawl Spring
33. Stop Ring Drum Lock
34. Tuning Knob Shaft
35. Tuning Drive Gear
36. Tuning Drive Limit Spline
37. Tuning Idler Gear
38. Tuning Spur Gear
39. Tuning Spur Gear Clutch
40. Tuned Element
41. Stop Bar
42. Stop Ring Drum Drive
43. Cam Drum Drive Gear
71. Home Stop Anchor
72. Home Stop Pawl Push Rod
73. Home Stop Anchor Spring
74. Pawl Lifting Shaft
75. Actuator Lever
76. Toggle Spring

Figure 6-31A. AN/ARR-15A Multiturn Unit, Sections

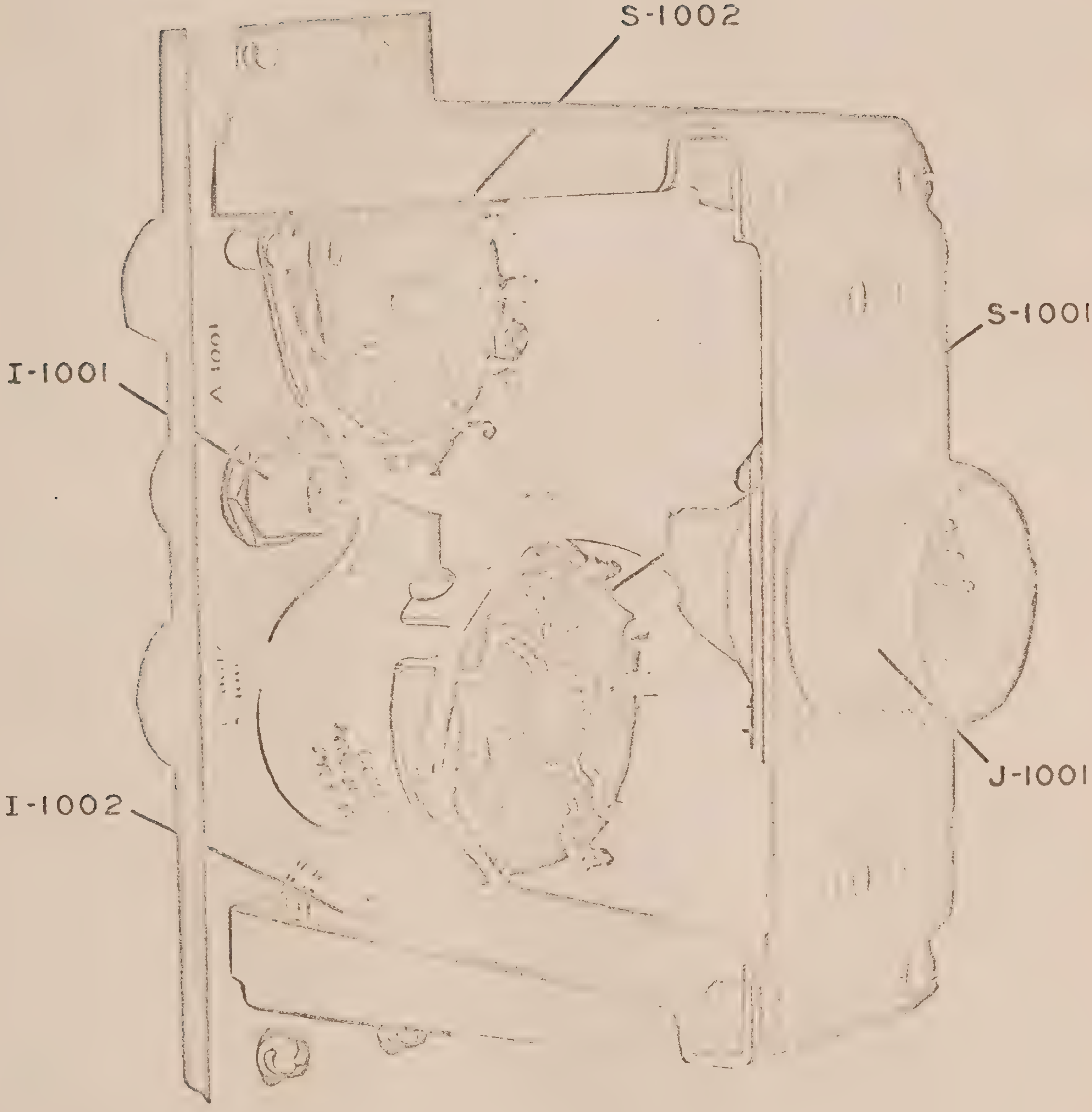


Figure 6-32. Radio Set Control C-733/ARR-15A, Parts Arrangement

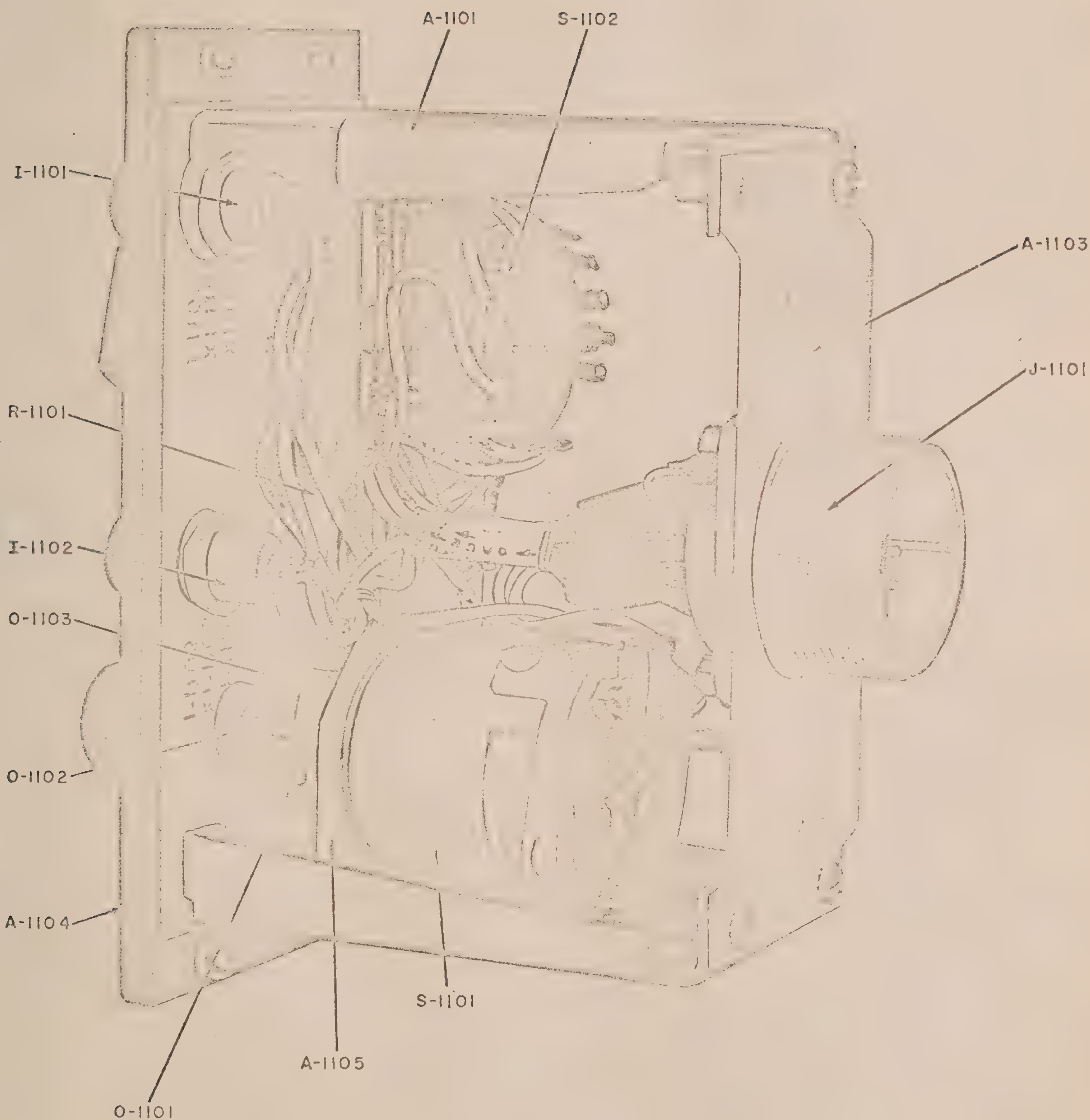


Figure 6-32A. Radio Set Control C-733A/ARR-15A, Parts Arrangement

SECTION VII

TABLE OF REPLACEABLE PARTS

1. GENERAL.

a. This section includes the Table of Replaceable Parts for Radio Sets AN/ARR-15 and AN/ARR-15A along with supplementary information for reference purposes, such as resistor and capacitor color code charts and explanation of reference symbols.

b. The parts listed in the table do not constitute a complete electrical and mechanical breakdown of the equipment. However, the Table lists all electrical parts together with such operative mechanical parts as are reasonably subject to loss or failure, with the exception of structural and minor parts such as standard bolts, screws, nuts, and the like. In some instances, individual detail parts of a subassembly may not be listed as separate items, since replacement of such items is impractical.

c. The Table comprises a list of parts of the Radio Sets plus a list of useful tools. No other accessories are included. All parts have reference symbol numbers. The reference symboled parts are arranged in the alphabetical and numerical order of their reference symbols.

d. The following tables list the contract information applicable to this equipment together with the identifying symbol used in the Table of Replaceable Parts.

AN/ARR-15

Contract	Serial Numbers	Symbol
N5sa-8648	1 through 318	*
N0a(s)-9216	329 through 600	†

AN/ARR-15A

Contract	Serial Numbers	Symbol
N0a(s)-9972	1 through 346	††
N0a(s)-51-103f	347 through 373	**
N0a(s)-51-244a	374 through 857	***
N0a(s)-10901	858 through 972	†††
N0a(s)-51-259	973 through 1751	°

C-733/ARR-15A

Contract	Serial Numbers	Symbol
N0a(s)-51-244a	1 through 300	***
N0a(s)-51-259	313 through 612	°

C-733A/ARR-15A

Contract	Serial Numbers	Symbol
N0a(s)-52-961	1 CQW—101 CQW except 7	ϕ
N0a(s)-52-1027	1 CQW—219 CQW less 139, 157, 171, 177, 208, 209, 210, 211, 212, 216, 218, 238, 239, 264, 273, 301, 325, 393, 405, 558, 569, 585	θ

2. ORDERING SPARE PARTS.

a. Each Service using this list has established certain depots and service groups for the storage and issue of spare parts to its organizations requiring them. The regulations of each Service should be studied to determine the method and source for requisitioning spare parts. The information in this list, as to manufacturer's or contractor's name, type, model or drawing number, is not to be interpreted as authorization to field agencies to attempt to purchase identical or comparable spare parts direct from the manufacturer or a wholesale or retail store except under emergency conditions, as covered by existing regulations of the Service concerned.

b. U.S. ARMY PERSONNEL: This table is for information *ONLY* and is not to be used as a basis for requisitioning parts. Authorities for obtaining maintenance items are as follows: 1. For using organizations; applicable Service publications of the 00-30 series of AAF Technical Orders. 2. For higher maintenance and supply echelons; the applicable Standard Maintenance List.

c. Where no JAN or Navy standard part number is given to a component, care should be taken in replacing the component with any other part than that listed in the Table of Replaceable Parts. This special part probably has been chosen for a special quality not available in standard components, and use of a standard component may result in decreased life or lowered performance.

3. REFERENCE SYMBOLS.

a. The reference symbols appearing in the Table correspond to those shown on the circuit schematic.

Each reference symbol consists of a letter followed by a three-digit number. The letter indicates the type of apparatus as explained below:

REFERENCE SYMBOL LETTERS

Letter	Type of Apparatus
A	Structural parts
B	Motors
C	Capacitors of all types
D	Dynamotors
E	Miscellaneous electrical parts, insulators, knobs, brushes, etc.
H	Hardware
I	Pilot lamps
J	Jacks and receptacles (fixed connectors male or female)
K	Contactors, relays
L	Inductors, r.f. and a.f.
N	Nameplates, dials, charts
O	Mechanical parts: bearings, shafts, couplings, gears, etc.
P	Plugs (movable connectors, male or female)
R	Resistors, fixed and variable, potentiometers, attenuators, etc.
S	Switches, interlocks, thermostats, thermo-regulators
T	Transformers, r.f., a.f. and power
V	Vacuum and gaseous discharge tubes
W	Wires, interconnecting cables, etc.
X	Sockets (electron tubes, pilot lamps, fuses, etc.)
Y	Mechanical oscillators, crystals, magneto-striction tubes, etc.
Z	Filters, i-f transformers, compound tuned circuit assemblies, etc. in a common container
CR	Rectifiers (electrochemical, copper oxide, selenium, crystals, etc., except vacuum or gaseous tubes)

The following table gives a complete list of the reference symbols, in correlation with the units that are used in this equipment:

Symbol Group	Army-Navy Type Designation	Name of Unit	Page No.
101-199	R-105/ARR-15 and R-105A/ARR-15	Aircraft Radio Receiver	
201-299		*LF Oscillator	
301-399		*HF Oscillator	
401-499		*CFI Oscillator	
501-599		*Relay Unit Assembly	
601-699	DY-34/ARR-15	Dynamotor	
901-999	MT-461/ARR-15	Mounting Base	
1001-1099	C-733/ARR-15A	Radio Set Control	
1101-1199	C-733A/ARR-15A	Radio Set Control	

*Considered a part of Aircraft Radio Receiver R-105/ARR-15 or R-105A/ARR-15.

4. ABBREVIATIONS USED IN TABLE.

Abbreviations	Meaning
adj	adjust
a-f	audio frequency
amp	ampere
assem	assembly
brg	bearing
cad	cadmium
C	Centigrade
coef	coefficient
cont	contact
c to c	center to center
deg	degrees
diam	diameter
dc	direct current
gnd	ground
HS	hermetically sealed
h	high
impr	impregnated
int	internal
i-f	intermediate frequency
ID	inside diameter
lg	long
max	maximum
mmf	micromicrofarads
mtg	mounting
neg	negative
o/a	overall
OD	outside diameter
pr	pair
p/o	part of
ph	phone
pl	plate
Rad	radio
RPM	revolutions per minute
RSW	resistance to salt water
r-f	radio frequency
sect	section
sw	switch
term	terminal
temp	temperature
thk	thick
tol	tolerance
unins	uninsulated
v	volts
vdcw	working volts dc
u/w	used with
wd	wide
w/	with

5. LIST OF MANUFACTURERS.

Code No.	Name Address
70229	Aladdin Radio Ind., Inc. 223 West Jackson Blvd. Chicago, Illinois
01121	Allen Bradley Company 136 West Greenfield Ave. Milwaukee 4, Wisconsin
02660	American Phenolic Corp. 1830 South 54th Avenue Chicago 50, Cicero P.O., Illinois
04777	Automatic Electric Sales Corporation 1033 W. Van Buren Street Chicago 7, Illinois
08664	Bristol Company 66 Bride Street Waterbury 91, Conn.
82066	J. H. Bunnell & Co. 81 Prospect Street Brooklyn 1, N. Y.
71468	Cannon Electric Co. 3209 Humboldt St. Los Angeles 31, California
71950	Centralab 900 E. Keefe Avenue Milwaukee 1, Wisconsin

Code No.	Name Address
97965	Chicago Transformer Corp. 3501 Addison Street Chicago 18, Illinois
13499	Collins Radio Company 855 35th Street NE Cedar Rapids, Iowa
72825	Hugh H. Eby, Inc. 18 West Chelten Avenue Philadelphia 44, Pa.
80029	Eureka-Williams Corp. Bloomington, Illinois
72354	John E. Fast & Co. 3123 North Pulaski Road Chicago 41, Illinois
99142	General Electric Co. Electronics Dept. 754 State Street Schenectady 7, New York
73949	Guardian Electric Mfg. Company 1400 West Washington Blvd. Chicago 7, Illinois
75378	James Knights Co. 131 S. Wells Street Sandwich, Illinois

Code No.	Name Address
80583	Hammarlund Mfg. Co. 460 W. 34th Street New York 1, N. Y.
75543	Lavelle Rubber Company 424 North Wood Street Chicago 22, Illinois
80392	Multi Electric Mfg. Co. Chicago, Illinois
42498	National Company, Inc. 61 Sherman Street Malden 48, Mass.
76649	National Fabricated Products Co. 2650 Belden Avenue Chicago 47, Illinois
76854	Oak Mfg. Company 1260 Clybourne Avenue Chicago 10, Illinois
77630	Radio Condenser Company Thorne and Capewood Streets Camden 4, New Jersey
77523	R. B. M. Manufacturing Company Fort Wayne 6, Indiana
50133	A. G. Redmond Company Owosso, Michigan
77885	J. P. Seeburg Corporation 1510 North Dayton Street Chicago 22, Illinois
78272	F. W. Sickles Company Box 920 Springfield 2, Mass.
53021	Sangamo Electric Co. Springfield, Illinois
90139	Sylvania Products Electronics Division 70 Forsyth Street Boston 15, Mass.
97487	United States Rubber Company 440 West Washington Street Chicago 6, Illinois
79061	Vaco Products Company 317 East Ontario Chicago 11, Illinois
83564	Wemac Company 502 South Isis Englewood, California
88667	Westinghouse Electric Corp. Springfield, Mass.
66099	Wincharger Corp. Sioux City, Iowa

6. RESISTOR AND CAPACITOR COLOR CODES.

Type designations consisting of combinations of letters and numbers are employed to identify JAN type resistors and capacitors. These designations indicate, in accordance with a code, the important electrical and physical characteristics of the part to which they refer. Where space limitations do not permit the type designations to be marked on the part, color bands or dots are used to indicate its electrical characteristics in accordance with a standard code. Explanations of the standard color codes and of the type designations for fixed composition resistors per JAN-R-11, fixed mica-dielectric capacitors per JAN-C-5 and fixed ceramic-dielectric capacitors per JAN-C-20 are given below.

a. Fixed Composition Resistors Per JAN-R-11

(1) *Type Designation.* — The type designation of fixed composition resistors is formed as follows:

RC	10	AE	153	M
Component (*a*)	Style (*b*)	Characteristic (*c*)	Resistance (*d*)	Tolerance (*e*)

(*a*) *Component.* — Fixed composition resistors covered by this specification are identified by the letters "RC" as the first two symbols of the type designation. "R" stands for resistor and "C" distinguishes the sub-class of composition resistors.

(*b*) *Style.*—The style is indicated by a two-digit symbol which identifies the power rating, physical shape, and size.

(*c*) *Characteristics.* — A two-letter symbol gives the characteristics of fixed composition resistors. The first letter denotes whether the element is insulated and its moisture resistance. The second letter denotes the resistance-temperature characteristic.

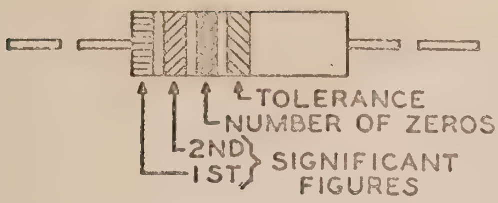
(*d*) *Resistance.* — The nominal resistance value in ohms is indicated by a three-digit symbol. The first two digits are the first two figures of the resistance values in ohms. The final digit specifies the number of zeros which follow the first two figures.

(*e*) *Resistance Tolerance.*—The symmetrical resistance tolerance in per cent is denoted by a letter as follows:

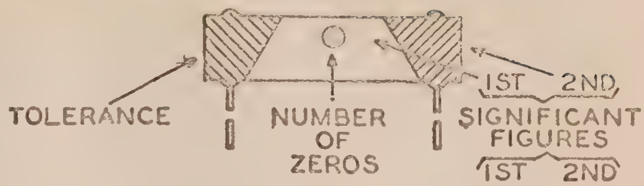
Letter	Tolerance
J	± 5 per cent
K	±10 per cent
M	±20 per cent

(2) *Color Code.*—The resistance and the resistance tolerance of fixed composition resistors are indicated by the position and color of bands in accordance with the following sketches and color code:

COLOR CODE FOR FIXED RESISTORS—Values in Ohms



Resistor with axial wire leads.



Resistor with radial wire leads.

BODY		END		DOT OR BAND		END	
1st Band		2nd Band		3rd Band		End Band	
Color	Value	Color	Value	Color	Value	Color	Tolerance
Black	0	Black	0	Gold	0.1	Gold (J)	± 5%
Brown	1	Brown	1	Silver	0.01	Silver (K)	±10%
Red	2	Red	2	Black	None	None (M)	±20%
Orange	3	Orange	3	Brown	0		
Yellow	4	Yellow	4	Red	00		
Green	5	Green	5	Orange	000		
Blue	6	Blue	6	Yellow	0000		
Violet	7	Violet	7	Green	00000		
Grey	8	Grey	8	Blue	000000		
White	9	White	9	Violet	0000000		
				Grey	00000000		
				White	000000000		

EXAMPLE FOR AXIAL-LEAD RESISTOR

Band	Color	Significant Figures		Number of Zeros	Tolerance
		1st	2nd		
1	red	2	..	..	....
2	orange	..	3	..	....
3	yellow	..	..	0000	....
4	gold	..	..	..	±5%

The resistance of this resistor is 230,000 ohms ±5%

EXAMPLE FOR RADIAL-LEAD RESISTOR

Position	Color	Significant Figures		Number of Zeros	Tolerance
		1st	2nd		
body	orange	3	..	..	....
end	blue	..	6	..	....
dot	green	..	.	00000	. ..
end	silver	..	..	..	±10%

The resistance of this resistor is 3,600,000 ohms ±10%

b. Fixed Mica-Dielectric Capacitors Per JAN-C-5.

(1) *Type Designation.*—The type designation of fixed mica-dielectric capacitors is formed as follows:

CM	20	A	050	M
Component (*a*)	Case (*b*)	Characteristic (*c*)	Capacitance (*d*)	Tolerance (*e*)

(*a*) *Component.* — All fixed mica-dielectric capacitors covered by this specification are identified by the letters "CM" as the first two symbols of the type designation.

(*b*) *Case.*—The case designation is a two-digit symbol which identifies a particular case, size and shape.

(*c*) *Characteristic.*—The characteristic properties of a capacitor in respect to temperature coefficient and maximum capacitance drift are indicated by a single letter.

(*d*) *Capacitance.* — The nominal capacitance value in micromicrofarads is indicated by a three-digit number. The first two digits are the first two digits of the capacitance value in micromicrofarads. The final digit specifies the number of zeros which follow the first two digits. If more than two significant figures are required, additional digits may be

used, the last digit always indicating the number of zeros.

(e) *Capacitance Tolerance.*—The symmetrical capacitance tolerances in per cent shall be designated by a letter as shown below:

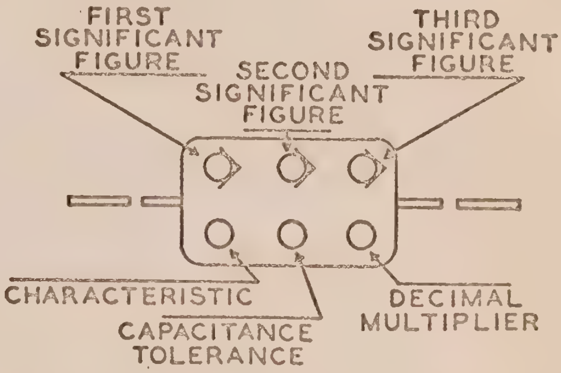
Tolerance	Designation Letter
± 2 per cent	G
± 5 per cent	J
±10 per cent	K
±20 per cent	M

(2) *Color Code.*—The capacitance, capacitance tolerance and the characteristic (temperature coefficient) of fixed mica-dielectric capacitors with molded cases are indicated by the position and color of six dots on the case in accordance with the following sketch and color code:

COLOR CODE FOR FIXED MICA CAPACITORS

Color	CAPACITANCE*		Tolerance	Characteristic
	Significant Figure	Decimal Multiplier		
Black	0	1	20% (M)	A
Brown	1	10	1%	B
Red	2	100	2% (G)	C
Orange	3	1000	3%	D
Yellow	4	....	4%	E
Green	5	....	5%	F
Blue	6	....	6%	G
Violet	7	....	7%	..
Gray	8	....	8%	..
White	9	....	9%	..
Gold	..	0.1	5% (J)	..
Silver	..	0.01	10% (K)	..

* Capacitance in micromicrofarads.



Color code scheme for JAN standard fixed mica capacitors. The significance of the letters denoting "characteristic" will be found in the Joint Army-Navy Specification JAN-C-5.

c. *Fixed Ceramic-Dielectric Capacitors Per JAN-C-20. (Temperature Compensating.)*

(1) *Type Designation.* — The type designation of fixed ceramic-dielectric capacitors indicates the component, style, characteristics, capacitance value and capacitance tolerance of the capacitor. The type designation is formed as follows:

CC	25	SL	100	G
Component	Style	Characteristic	Capacitance	Capacitance Tolerance
(a)	(b)	(c)	(d)	(e)

(a) *Component.* — Fixed ceramic-dielectric capacitors covered by this specification are identified by the symbol "CC," the first "C" for capacitor and the second "C" for the sub-class having ceramic dielectric.

(b) *Style.*—The style designation is a two-digit symbol which identifies the particular shape and size of the capacitor.

(c) *Characteristics.*—The characteristic designation is in the form of two letters. The first letter specifies the temperature coefficient of capacitance. The second letter indicates the tolerance on this temperature coefficient.

(d) *Capacitance Value.*—The nominal capacitance value in micromicrofarads is identified by a three-digit number. The first two digits are the first two digits of the capacitance value in micromicrofarads. The final digit specifies the number of zeros which follow the first two digits. Where more than two significant figures are required, additional digits may be used, the last digit always indicating the number of zeros. If the capacitance value is expressed as a decimal fraction, the decimal point shall be indicated by an "R," and there shall be no indication of a number of zeros to follow the significant figures. Thus 1R5 indicates 1.5 micromicrofarads.

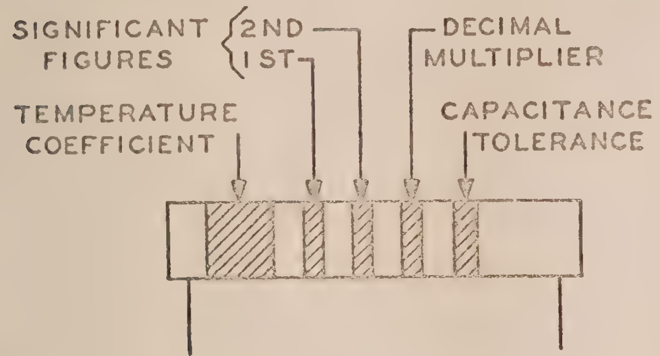
(e) *Capacitance Tolerance.* — The symmetrical capacitance tolerance is designated by a letter as shown below. Where the nominal value of capacitance is greater than 10 micromicrofarads, the tolerance shall be expressed in per cent; and where 10 micromicrofarads or smaller, the tolerance shall be expressed in micromicrofarads.

Letter Symbol	± Tolerance Per Cent	mmf
C	—	0.25
D	—	0.5
F	1	1.0
G	2	2.0
J	5	—
K	10	—
M	20	—

(2) *Color Code.*—Refer to sketch and table below.

COLOR CODE—FIXED CERAMIC—DIELECTRIC CAPACITORS**

TYPE DESIGNATION.



COLOR CODE.

Color	Significant Figure	Multiplier	± TOLERANCE OF CAPACITANCE*: Capacitors of Greater than 10 mmf Tol. in Per Cent	Capacitors of 10 mmf or Smaller Tol. in mmf	Temperature Coefficient of Capacitance Parts/Million/°C
Black	0	1	20 (M)	2.0 (G)	0
Brown	1	10	1 (F)	----	— 30
Red	2	100	2 (G)	----	— 80
Orange	3	1000	----	----	—150
Yellow	4	----	----	----	—220
Green	5	----	5 (J)	0.5 (D)	—330
Blue	6	----	----	----	—470
Violet	7	----	----	----	—750
Gray	8	0.01	----	0.25 (C)	+ 30
White	9	0.1	10 (K)	1.0 (F)	—330 ±500

*The letter symbol for each tolerance is given in parentheses after the tolerance value.

**Color code scheme for JAN standard for fixed ceramic capacitors. The significance of the letters denoting "characteristic" will be found in the Joint Army-Navy Specifications JAN-C-20.

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: RADIO RECEIVERS R-105/ARR-15 and R-105A/ARR-15

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	MFR. and DESIG. or AWS TYPE	CONT. or GOVT. DWG. or SPEC. No.
101-199* †	R-105/ARR-15	Radio Receiver		13499, Type #51H-1	520 2544 00
101-199†† *** ††† ° ** φ θ °°	R16-R-2037 R5821-179-1220-E121	Radio Receiver R-105A/ARR-15 Effective with serial #1.		13499, Type #51H-4 82066, Part #120500	520 4330 00 120500†††
A-101A	R5355-090-3260-E111	WINDOW, dial: plexiglass window for calibrate dial.	Window for O-136	13499 82066, Part #120514	502 6664 002 120514†††
A-101B	R5820-431-7930-E111	BEZEL, dial window: metal bezel for calibrate dial window, black.	Bezel for A-101A	13499 82066, Part #120513	502 6663 002 120513†††
A-102A	R5820-392-5720-E111	WINDOW, dial: plexiglass window for tuning dial.	Window for O-137	13499 82066, Part #120512	502 6662 002 120512†††
A-102B	R5820-431-7931-E111	BEZEL, dial window: metal bezel for tuning dial window, black.	Bezel for A-102A	13499 82066, Part #120511	502 6661 002 120511†††
A-103	R5820-431-7929-E111	COVER, aluminum: for Autotune Control Unit Collins Rad type #111B-4.	Cover for O-147	13499	503 3434 003
A-104	R5945-242-4898-E111	COVER, aluminum: for Relay K-102.	Cover for K-102	13499 82066, Part #120552	502 6545 002 120552†††
A-105	R5945-383-1379-D334	COVER, aluminum: for Relay Unit Assembly, Collins Rad part #502 6798 002 or Bunnel Part #120602.	Cover for Relay Unit Assembly	13499 82066, Part #120602	502 6785 002 120602†††
A-106	R5820-431-7963-E111	COVER, aluminum: for Line Filter Assembly, Collins Rad part #502 4607 004 or Bunnell part #120506.	Cover for Z-126	13499 82066, Part #120506	502 6763 002 120506†††
A-107	R5820-424-9253-E111	COVER, aluminum: for CFI Assembly, Collins Rad part #520 3496 00 or Bunnell part #120502.	Cover for CFI Unit	13499 82066, Part #120502	502 6861 003 120502†††
A-108	R5820-431-7964-E111	COVER, aluminum: RF shield (right side of receiver).	Shield	13499 82066, Part #120543	502 6966 003 120543†††
A-109	R5820-431-7965-E111	COVER, aluminum: Exciter shield (right side of receiver).	Shield	13499 82066, Part #120505	502 6967 003 120505†††

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** Contract N0a(s)-51-103f
φ Contract N0a(s)-52-961
† Contract N0a(s)-9216
*** Contract N0a(s)-51-244a
θ Contract N0a(s)-52-1027
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
° Contract N0a(s)-51-259
°° Contract N0a(s)-53-983

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: RADIO RECEIVERS R-105/ARR-15 and R-105A/ARR-15

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	DESIG. or AWS TYPE MFR. and	CONT. or GOVT. DWG. or SPEC. No.
A-110	R5940-432-2882-E121	COVER: Shield for J-103 (right side of receiver).	Shield	13499 82066, Part #120544	502 6504 002 120544†††
A-111	R5820-432-0292-E121	COVER, aluminum: IF shield (left side of receiver).	IF shield	13499 82066, Part #120504	502 4465 002 120504†††
A-112	R5960-273-2468-E121	COVER, aluminum w/moulded on gasket: hermetically sealed cover for V-201.	Gasketed cover for V-201	13499 82066, Part #121425	502 4288 002 121425†††
A-113	R5960-273-2467-E121	COVER, aluminum w/moulded on gasket: hermetically sealed cover for V-301.	Gasketed cover for V-301	13499 82066, Part #121425	502 4283 001 121425†††
A-114	R5820-431-7998-E111	COVER, aluminum: Shield for IF transformer.	Shield for 1st IF transformer Z-119	13499 82066, Part #120520	503 4864 003 120520†††
A-115	R5820-431-7998-E111	COVER, aluminum: Same as Ref. A-114.	Shield for 2nd IF transformer Z-120		
A-116	R5820-431-7998-E111	COVER, aluminum: Same as Ref. A-114.	Shield for 3rd IF transformer Z-121		
A-117	R5820-424-9598-E111	COVER, aluminum: Shield for Antenna Coil Assembly.	Shield for Z-123	13499 82066, Part #120525	502 6903 002 120525†††
A-118	R5820-431-7966-E111	COVER. aluminum: Shield for Bandpass Coil Assembly.	Shield for Z-124	13499 82066, Part #120524	502 6901 002 120524†††
A-119	R5820-424-9597-E111	COVER, aluminum: Shield for Exciter Coil Assembly.	Shield for Z-125	13499 82066, Part #120523	502 6836 003 120523†††
A-120	R5820-431-9401-E111	HAND RAILS: on front panel of receiver.	Handles (2 used)	13499 82066, Part #120507	502 6956 002 120507†††
A-121	R5820-497-0167-E111	MAINTENANCE PARTS KIT: for MT-461/ARR-15 Mounting Base; Robinson Aviation, Inc. dwg. #R-4327E, part #R-4275A; consisting of:	Maintenance parts for MT-461/ARR-15	13499	200 0163 00
A-121†††		Not used.			
		QUAN. — NAME — COLLINS NO.			
A-121A		8 — Pressure Plate — #200 0164 00	(Part of A-121)		
A-121B		8 — Lock Clip — #200 0165 00	(Part of A-121)		
A-121C		8 — Buffer — #200 0166 00	(Part of A-121)		

A-121D		4	Button	#200 0167 00	(Part of A-121)		
A-121E		2	Cushion (Orange Dot)	#200 0168 00	(Part of A-121)		
A-121F		4	Cushion (Yellow Dot)	#200 0169 00	(Part of A-121)		
A-121G		2	Cushion (Green Dot)	#200 0170 00	(Part of A-121)		
A-121H		4	Bonding Jumper	#200 0171 00	(Part of A-121)		
A-121 J	G43-S-8951	6	#6-32 x ¼" Screw	#323 0051 00	(Part of A-121)		
A-121K	R43-CR-313-0036-00	6	#6-32 Hex Nut	#313 0036 00	(Part of A-121)		
A-121L	R5310-167-0847-G192	6	#6 Shakeproof Washer	#373 7020 00	(Part of A-121)		
°° ϕθ		MAINTENANCE PARTS KIT: for MT-461A/ARR-15 Mounting Base; Robinson Aviation (Collins Part #200-0495-00) Robinson Avia part #R-6394; consisting of:					
	R42-R-710	2	Fastener Assembly	200 0569 00			
	R42-C-13775	2	Plunger Assembly	200 0570 00			
		4	Bonding Jumper	200 0571 00			
		4	Lock Washer	373 0491 00			
	R43-S-191204	2	#6-32 x ¼ RHMS	343 0491 00			
	R43-S-191202	4	#6-32 x ¼ RHMS	343 0489 00			
	R43-N-40525	4	#6-32 Hex Nut	313 0001 00			
		8	Lock Clips	200 0572 00			
		8	Pressure Plates	200 0573 00			
	R5825-323-0425-E111	8	Spring Covered Plates	200 0574 00			
	R16-CR-200-0575-00	8	Pad-limiter	200 0575 00			
	R16-CR-200-0576-00	8	Pad Shock	200 0576 00			
		8	Retainer	200 0577 00			
A-122†††	R16-C-37379	COVER: Copper, silver plated, for antenna post.			Holds antenna wire to post	82066 Part #120640	120640†††
A-123†††	R16-S-9999	SUPPORT: Copper, silver plated, for rf wire.			Coaxial wire fitting	82066 Part #121389	121389†††
B-101	R5800-C03-3807-FCRC	MOTOR: D-C Shunt wound; 26.5 v; closed 2-45/64" 3⅜" max. overall; exclusive of shaft; pinion gear attached. *Motor supplied by Emerson Elec. Co. under Collins part number 502 6576 003. †, ††, **, ***, °, †††, ϕ, θ, °° Alternate motor Collins part number 503 7066 004; Effective with serial #456.			AUTOTUNE motor	13499	502 6914 002

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** Contract N0a(s)-51-103f
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θ Contract N0a(s)-52-1027
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
° Contract N0a(s)-51-259
°° Contract N0a(s)-53-983

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: RADIO RECEIVERS R-105/ARR-15 and R-105A/ARR-15

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	MFR. and DESIG. or AWS TYPE	CONT. or GOVT. DWG. or SPEC. No.
B-101†††	R17-M-4598-249	MOTOR: D-C Shunt wound; 26.5 v; 4 amp 1 15, hp, 5800 rpm; closed frame; solder lug terminals; 5" lg x 2⅞" wd x 3½" h max o/a; includes pinion gear, pilot light assy and mtg. bases. Motor supplied by Westinghouse Elec. Co., Lima, Ohio under J. H. Bunnel & Company #B-120767.	AUTOTUNE motor	82066 Part #121431	121431†††
C-101	R16-C-8345-3	CAPACITOR: Fixed; tubular; ceramic; 100 mmf ±20%; neg temp coef 330 PPM °C +500 PPM/°C −725 PPM/°C; 500 volts dcw; .24" dia x .46" long with No. 22 AWG; radial wire leads 1¼" long.	r-f amplifier avc by-pass	CC30SJ101M	JAN-C-20A 916 4004 00
C-102	R16-C-10491	CAPACITOR: Fixed; mica-dielectric; .01 mf ±20%; 300 volts dcw; 11/32" x 53/64" x 53/64" with No. 18 AWG; radial wire leads.	r-f amplifier avc by-pass	CM35B103M	MIL-C-5 935 2118 00
C-103	R16-C-10491	CAPACITOR: Fixed; mica-dielectric; 0.1 mf ±20%; 300 volts dcw; 11/32" x 53/64" x 53/64" with No. 18 AWG; radial wire leads.	r-f amplifier cathode by-pass	CM35B103M	MIL-C-5 935 2118 00
C-104	R16-C-10491	CAPACITOR: Fixed; mica-dielectric; 0.1 mf ±20%; 300 volts dcw; 11/32" x 53/64" x 53/64" with No. 18 AWG; radial wire leads.	r-f amplifier screen by-pass	CM35B103M	MIL-C-5 935 2118 00
C-105		CAPACITOR: Fixed, ceramic dielectric; 500 vdc working, 1 uuf ±¼ uuf; −330 uuf/uf/°C, +250 uuf/uf/°C; tubular, 0.200 in. dia by 0.400 in. lg	Band F band pass	CC20CK010C	JAN-C-20A 916 0625 00
C-105φθ°°		CAPACITOR: Fixed, ceramic dielectric; 500 vdc working, 2 uuf ±¼ uuf; −330 uuf/uf/°C, +250 uuf/uf/°C; tubular, 0.200 in. dia by 0.400 in. lg	Band F band pass	CC20SK1R5C	JAN-C-20A 916 0627 00

C-106		CAPACITOR: Fixed, ceramic dielectric; 500 vdc working, 1 uuf ±1/4 uuf; −330 uuf/uf/°C, +250 uuf/uf/°C; tubular, 0.200 in. dia by 0.400 in. lg	Band F band pass	CC20SK010C	JAN-C-20A 916 0625 00
C-106φθ °°		CAPACITOR: Fixed, ceramic dielectric; 500 vdc working, 2 uuf ±1/4 uuf; −330 uuf/uf/°C, +250 uuf/uf/°C; tubular, 0.200 in. dia by 0.400 in. lg	Band F band pass	CC20SK020C	JAN-C-20A 916 0629 00
C-107		CAPACITOR: Fixed, ceramic dielectric; 500 vdc working, 1.5 uuf ±1/4 uuf; −330 uuf/uf/°C, +250 uuf/uf/°C; tubular, 0.200 in. dia by 0.400 in. lg	Band E band pass	CC20SK1R5C	JAN-C-20A 916 0627 00
C-107φθ °°		CAPACITOR: Fixed, ceramic dielectric; 500 vdc working, 2 uuf ±1/4 uuf; −330 uuf/uf/°C, +250 uuf/uf/°C; tubular, 0.200 in. dia by 0.400 in. lg	Band E band pass	CC20SK020C	JAN-C-20A 916 0629 00
C-108		CAPACITOR: Fixed, ceramic dielectric; 500 vdc working, 1.5 uuf ±1/4 uuf; −330 uuf/uf/°C, +250 uuf/uf/°C; tubular, 0.200 in. dia by 0.400 in. lg	Band E band pass	CC20SK1R5C	JAN-C-20A 916 0627 00
C-108φθ °°		CAPACITOR: Fixed, ceramic dielectric; 500 vdc working, 2 uuf ±1/4 uuf; −330 uuf/uf/°C, +250 uuf/uf/°C; tubular, 0.200 in. dia by 0.400 in. lg	Band E band pass	CC20SK020C	JAN-C-20A 916 0629 00
C-109		CAPACITOR: Fixed, ceramic dielectric; 500 vdc working, 2 uuf ±1/4 uuf; −330 uuf/uf/°C, +250 uuf/uf/°C; tubular, 0.200 in. dia by 0.400 in. lg	Band D band pass	CC20SK020C	JAN-C-20A 916 0629 00
C-110	R16-C-10491	CAPACITOR: Fixed; mica-dielectric; 0.01 mf ±20%; 300 volts dcw; 11/32" x 53/64" with #18 AWG; radial wire leads.	Filament by-pass	CM35B103M	MIL-C-5 935 2118 00

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** Contract N0a(s)-51-103f
φ Contract N0a(s)-52-961
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θ Contract N0a(s)-52-1027
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
° Contract N0a(s)-51-259
°° Contract N0a(s)-53-983

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: RADIO RECEIVERS R-105/ARR-15 and R-105A/ARR-15

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	MFR. and DESIG. or AWS TYPE	CONT. or GOVT. DWG. or SPEC. No.
C-109		CAPACITOR: Fixed, ceramic dielectric; 500 vdc working, 1.5 uuf ±1/4 uuf; −330 uuf/uf/°C, +250 uuf/uf/°C; tubular, 0.200 in. dia by 0.400 in. lg	Band D band pass	CC20SK1R5C	JAN-C-20A 916 0627 00
C-110	R16-C-10491	CAPACITOR: Fixed, mica dielectric; 0.01 uuf ±20%; 300 vdc working; 11/32 in. by 53/64 in. with #18 AWG; radial wire leads.	Filament by-pass	CM35B103M	MIL-C-5 935 2118 00

C-111		CAPACITOR: Fixed, ceramic dielectric; 500 vdc working, 3 uuf ±¼ uuf; −330 uuf/uf/°C, +120 uuf/uf/°C; tubular, 0.200 in. dia by 0.400 in. lg	Band C band pass	CC20SJ030C	JAN-C-20A 916 0596 00
C-112	R16-C-8352-825	CAPACITOR: Fixed, ceramic dielectric; 500 vdc working, 180 uuf ±5%; 0 uuf/uf/°C, +30 uuf/uf/°C; tubular, 0.415 in. dia by 1.300 in. lg	Mixer grid tank	CC45CG181J	JAN-C-20A 916 7002 00
C-113		CAPACITOR: Fixed, ceramic dielectric; 500 vdc working, 8.0 uuf ±1 uuf; −330 uuf/uf/°C, +60 uuf/uf/°C; tubular, 0.200 in. dia by 0.400 in. lg	Band C band pass	CC20SH080F	JAN-C-20A 916 0341 00
C-114		CAPACITOR: Fixed, ceramic dielectric; 500 vdc working, 18 uuf, ±10%; −330 uuf/uf/°C, +500 uuf/uf/°C; tubular, 0.200 in. dia by 0.400 in. lg	Band A band pass	CC20SL180K	JAN-C-20A 916 0601 00
C-115* † †† †††	R16-C-8342-35	CAPACITOR: Fixed, ceramic dielectric; 500 vdc working, 100 uuf ±10% uuf; −330 uuf/uf/°C, +500 uuf/uf/°C; tubular, 0.240 in. dia by 0.460 in. lg	Mixer grid coupling	CC30SL101K	JAN-C-20A 916 4003 00
C-115** ** ° ϕ θ °°	R16-C-8344-910	CAPACITOR: Fixed, ceramic dielectric; 500 vdc working, 100 uuf, ±10%; −330 uuf/uf/°C, tubular, 0.250 in. dia by 0.812 in. lg	Mixer grid coupling	CC26SL101K	JAN-C-20A 916 3100 00
C-116	R16-C-10491	CAPACITOR: Fixed; mica-dielectric; 0.01 mf ±20%; 300 volts dcw; 11/32" x 53/64" x 53/64" with No. 18 AWG radial wire leads 1⅛" long.	Mixer cathode by-pass	CM35B103M	MIL-C-5 935 2118 00
C-117	R16-C-10491	CAPACITOR: Fixed; mica-dielectric; 0.01 mf ±20%; 300 volts dcw; 11/32" x 53/64" x 53/64" with No. 18 AWG radial wire leads 1⅛" long.	Mixer plate by-pass	CM35B103M	MIL-C-5 935 2118 00
C-118	R16-C-10491	CAPACITOR: Fixed; mica-dielectric; 0.01 mf ±20%; 300 volts dcw; 11/32" x 53/64" x 53/64" with No. 18 AWG radial wire leads 1⅛" long.	1st i-f avc by-pass	CM35B103M	MIL-C-5 935 2118 00
C-119* †	R16-C-11708-500	CAPACITOR: Fixed; paper dielectric; .5 mf +40 −15%; 200 volts dcw; ¾" x 1" x 1-13/16"; with solder lug terminals (magnetic or non-magnetic case).	r-f and first i-f cathode by-pass	CP52B1FC504X	MIL-C-25 961 6005 00

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θ Contract N0a(s)-52-1027
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
° Contract N0a(s)-51-259
°° Contract N0a(s)-53-983

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: RADIO RECEIVERS R-105/ARR-15 and R-105A/ARR-15

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	DESIG. or AWS TYPE MFR. and	CONT. or GOVT. DWG. or SPEC. No.
C-119†† ††† ** *** ° φθ °°	R16-C-11708-500	CAPACITOR: Fixed; paper dielectric; .5 mf +40 —15%; 200 volts dcw; ¾" x 1" x 1-13/16"; with solder lug terminals (non-magnetic case). Effective with serial #1.	r-f and first i-f cathode by-pass	CP55B1FC504X	MIL-C-25 961 6077 00
C-120	R16-C-10491	CAPACITOR: Fixed; mica-dielectric; .01 mf ±20%; 300 volts dcw; 11/32" x 53/64" x 53/64" with No. 18 AWG radial wire leads 1⅛" long.	1st i-f cathode by-pass	CM35B103M	MIL-C-5 935 2118 00
C-121	R16-C-10491	CAPACITOR: Fixed; mica-dielectric; .01 mf ±20%; 300 volts dcw; 11/32" x 53/64" x 53/64" with No. 18 AWG radial wire leads 1⅛" long.	1st i-f screen by-pass	CM35B103M	MIL-C-5 935 2118 00
C-122	R16-C-10491	CAPACITOR: Fixed; mica-dielectric; .01 mf ±20%; 300 volts dcw; 11/32" x 53/64" x 53/64" with No. 18 AWG radial wire leads 1⅛" long.	1st i-f plate by-pass	CM35B103M	MIL-C-5 935 2118 00
C-123	R16-C-10491	CAPACITOR: Fixed; mica-dielectric; .01 mf ±20%; 300 volts dcw; 11/32" x 53/64" x 53/64" with No. 18 AWG radial wire leads 1⅛" long.	2nd i-f cathode by-pass	CM35B103M	MIL-C-5 935 2118 00
C-124	R16-C-10491	CAPACITOR: Fixed; mica-dielectric; .01 mf ±20%; 300 volts dcw; 11/32" x 53/64" x 53/64" with No. 18 AWG radial wire leads 1⅛" long.	2nd i-f screen by-pass	CM35B103M	MIL-C-5 935 2118 00
C-125	R16-C-10491	CAPACITOR: Fixed; mica-dielectric; .01 mf ±20%; 300 volts dcw; 11/32" x 53/64" x 53/64" with No. 18 AWG radial wire leads 1⅛" long.	Alignment isolating	CM35B103M	MIL-C-5 935 2118 00
C-126	R16-C-10491	CAPACITOR: Fixed; mica-dielectric; .01 mf ±20%; 300 volts dcw; 11/32" x 53/64" x 53/64" with No. 18 AWG radial wire leads 1⅛" long.	2nd i-f plate by-pass	CM35B103M	MIL-C-5 935 2118 00
C-127* †	R16-C-8342-35	CAPACITOR: Fixed; tubular; ceramic; 100 mmf ±10%; neg temp coef 300 PPM/°C +500 PPM/°C —725 PPM/°C; 500 volts dcw; .24" dia x .46" long with No. 22 AWG radial wire leads 1¼" long.	avc coupling	CC30SL101K	JAN-C-20 A 916 4003 00
C-127†† ††† ** *** φθ ° °°	R16-C-8344-910	CAPACITOR: Fixed; tubular; ceramic; 100 mmf ±10%; neg temp coef 330 (tol +500 —720) PPM/°C; 500 volts dcw; .250" diam. x .812" lg, with axial wire leads, insulated; Effective with serial #1.	avc coupling	CC26SL101K	JAN-C-20A 916 3100 00

C-128* † †††		CAPACITOR: Fixed, ceramic dielectric; 500 vdc working, 20 uuf ±5%; 330 uuf/uf/°C, +60 uuf/uf/°C; tubular, 0.200 in. dia by 0.400 in. lg	bfo coupling	CC20SH200J	JAN-C-20A 916 0363 00
C-128†† ** *** ° φ θ °°		CAPACITOR: Fixed, ceramic dielectric; 500 vdc working, 20 uuf ±5%; −330 uuf/uf/°C, +60 uuf/uf/°C; tubular, 0.250 in. dia by 0.562 in. lg	bfo coupling	CC21SH200J	JAN-C-20A 916 1635 00
C-129	R16-C-11336-69-75	CAPACITOR: Fixed; paper dielectric; three section; 1 mf ±20% per section; 600 volts dcw; ¾ in. by 1 in. by 1 3/16 in.		CP55BFE104M	MIL-C-25 961 6183 00
C-129A		Section of C-129	Unused		
C-129B		Section of C-129	Balance tube plate filter		
C-129C		Section of C-129	avc output filter		
C-129φ θ		CAPACITOR: Fixed, paper dielectric; three section; 1 uf ±20% per section; 600 vdc working; ¾ in. by 1 in. by 1 3/16 in.		CP55BFE104M	MIL-C-25 961 6183 00
C-130	R16-C-10491	CAPACITOR: Fixed; mica-dielectric; .01 mf ±20%; 300 volts dcw; 11/32" x 53/64" x 53/64" with No. 18 AWG radial wire leads 1⅛" long.	Impulse Coupling	CM35B103M	MIL-C-5 935 2118 00
C-131* †		CAPACITOR: Fixed, ceramic dielectric; 500 vdc working, 120 uuf ±5%; −330 uuf/uf/°C, +60 uuf/uf/°C; tubular, 0.200 in. by 0.400 in lg	r-f by-pass	CC20SH200J	JAN-C-20A 916 0363 00
C-131†† ††† ** *** φ θ ° °°	R16-C-9997-36	CAPACITOR: Fixed mica dielectric; 330 mmf ±10%; 500 volts dcw; temp coef letter C; 51/64" lg x 15/32" wd x 7/32" thk, axial wire leads; Effective with serial #1.	r-f by-pass	CM20C331K	MIL-C-5 935 0208 00
C-132* †	R5910-161-1133-F632	CAPACITOR: Fixed, ceramic dielectric; 500 vdc working, 51 uuf ±5%; −750 uuf/uf/°C, +120 uuf/uf/°C; tubular, 0.200 in. dia by 0.400 in. lg	Accelerator tube r-f coupling	CC20UJ510J	JAN-C-20A 916 0476 00
C-132†† ††† ** *** φ θ ° °°		CAPACITOR: Fixed, ceramic dielectric; 500 vdc working, 51 uuf ±5%; −750 uuf/uf/°C, +120 uuf/uf/°C; tubular, 0.250 in. dia by 0.562 in. lg	Accelerator tube r-f coupling	CC21UJ510J	JAN-C-20A 916 1724 00

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** Contract N0a(s)-51-103f
φ Contract N0a(s)-52-961
† Contract N0a(s)-9216
*** Contract N0a(s)-51-244a
θ Contract N0a(s)-52-1027
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
° Contract N0a(s)-51-259
°° Contract N0a(s)-53-983

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: RADIO RECEIVERS R-105/ARR-15 and R-105A/ARR-15

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	DESIG. or AWS TYPE MFR. and	CONT. or GOVT. DWG. or SPEC. No.
C-133	R16-C-10017-24-501	CAPACITOR: Fixed; mica dielectric; 470 mmf ±20%; 500 volts dcw; 7/32" x 15/32" x 51/64"; with No. 20 AWG radial wire leads 1⅛" long.	Noise limiter time constant	CM20B471M	MIL–C–5 935 0135 00
C-134	R16-C-10491	CAPACITOR: Fixed; mica-dielectric; .01 mf ±20%; 300 volts dcw; 11/32" x 53/64" x 53/64" with No. 18 AWG radial wire leads 1⅛" long.	First audio coupling	CM35B103M	MIL–C–5 935 2118 00
C-135	R16-C-10491	CAPACITOR: Fixed; mica-dielectric; .01 mf ±20%; 300 volts dcw; 11/32" x 53/64" x 53/64" with No. 18 AWG radial wire leads 1⅛" long.	Audio output equalizing	CM35B103M	MIL–C–5 935 2118 00
C-136	R16-C-10491	CAPACITOR: Fixed; mica-dielectric; .01 mf ±20%; 300 volts dcw; 11/32" x 53/64" x 53/64" with No. 18 AWG radial wire leads 1⅛" long.	Multiplier cathode by-pass	CM35B103M	MIL–C–5 935 2118 00
C-137	R16-C-10491	CAPACITOR: Fixed; mica-dielectric; .01 mf ±20%; 300 volts dcw; 11/32" x 53/64" x 53/64" with No. 18 AWG radial wire leads 1⅛" long.	Multiplier screen by-pass	CM35B103M	MIL–C–5 935 2118 00
C-138	R16-C-10491	CAPACITOR: Fixed; mica-dielectric; .01 mf ±20%; 300 volts dcw; 11/32" x 53/64" x 53/64" with No. 18 radial wire leads 1⅛" long.	hf oscillator line filter	CM35B103M	MIL–C–5 935 2118 00
C-139	R16-C-10491	CAPACITOR: Fixed; mica-dielectric; .01 mf ±20%; 300 volts dcw; 11/32" x 53/64" x 53/64"; with No. 18 radial wire leads 1⅛" long.	Multiplier plate by-pass	CM35B103M	MIL–C–5 935 2118 00
C-140	R16-C-8342-35	CAPACITOR: Fixed; tubular; ceramic; 100 mmf ±10%; neg temp coef; 330 PPM/°C +500 —725 PPM/°C; 500 volts dcw; .24" dia x .46" lg, radial wire leads.	Mixer hf oscillator coupling	CC30SL101K	JAN–C–20A 916 4003 00
C-141	R5910–433–7306–FCRC	CAPACITOR: Fixed; paralleled silver mica and ceramic; 490-520 mmf; max +10%; min —10%; temp coef 0 PPM/°C ±30 PPM/°C; 500 volts dcw; .656" dia x .656" thick; solder lug terminals.	Multiplier band A & B trimmer	13499	502 6737 002
C-141†††	R5910–433–7306–FCRC	CAPACITOR: Assembly consisting of: paralleled silver mica and ceramic; 481-518 mmf, max +10%; min —10%; temp coef per JAN-C-20 (SL); 500 vdcw; 0.656" diam x 0.656" h; solder lug term.	Multiplier band A & B trimmer	71590 Part #DS002-008	

C-142	R5910–433–7307–FCRC	CAPACITOR: Semi-variable; paralleled mica and ceramic; 95-120 mmf; max +10%; min —10%; 0 PPM/°C ±30 PPM/°C; 400 volts dcw; .656" dia x .656" thick; solder lug terminals.	Multiplier band C & E trimmer	13499	502 6738 002
C-142†††	R5910–433–7307–FCRC	CAPACITOR: Assembly consisting of: paralleled silver mica and ceramic; 95-120 mmf, max +10%; Min —10%; temp coef per JAN-C-20 (SL); 500 vdcw; 0.656" diam x 0.656" h; solder lug term.	Multiplier band C & E trimmer	71590 Part #DS002-004	
C-143	R5910–433–7308–FCRC	CAPACITOR: Semi-variable; paralleled silver mica and ceramic; 28-53 mmf; max +10%; min —10%; 400 volts dcw; .656" dia x .656" thick; solder lug terminals.	Multiplier band D & F trimmer	13499	502 6739 002
C-143†††	R5910–433–7308–FCRC	CAPACITOR: Assembly consisting of: paralleled silver mica and ceramic; 28-53 mmf, max +10%; min —10%; temp coef per JAN-C-20 (SL); 500 vdcw; 0.656" diam x 0.656" h; solder lug term.	Multiplier band D & F trimmer	71590 Part #DS002-001	
C-144	R16-C-11713-60	CAPACITOR: Fixed, paper dielectric; 4 uf ±20%; 600 vdc working; 1½ in. dia by 4½ in. lg	High voltage filter	CP40C2FF405M	MIL–C–25 961 3001 00
C-145	R16-C-11707-18-50	CAPACITOR: Fixed; paper; dual section; .1 mf and 1. mf +40% —15%; 400 volts dcw and 75 volts dcw: ⅞" x 1¼" x 2".		72354 Type Z1700 Special	930 0027 00
C-145A		Section of C-145	High voltage filter		
C-145B		Section of C-145	Low voltage filter		
C-146	R16-C-11296	CAPACITOR: Fixed; paper; .1 mf +40% —15%; 100 volts dcw; ½" dia x 1-11/16" long; with No. 16 AWG radial wire leads ¾" x 4½".	Line filter	72354 Part #178016	930 0028 00
C-147	R16–C–7865–102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" overall; solder lug terminals; 3 mtg lugs.	Line filter	71590 Type B831 (Special)	912 0008 00
C-147†††	R16–C–7865–102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" overall; solder lug terminals; 3 mtg lugs.	Line filter	53021 Type M-101	
C-148	R16–C–7865–102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" overall; solder lug terminals; 3 mtg lugs.	Line filter	71590 Type B831 (Special)	912 0008 00

* Contract N5sa-8648
** Contract N0a(s)-51-103f
ϕ Contract N0a(s)-52-961
† Contract N0a(s)-9216
*** Contract N0a(s)-51-244a
θ Contract N0a(s)-52-1027
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
° Contract N0a(s)-51-259
°° Contract N0a(s)-53-983

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: RADIO RECEIVERS R-105/ARR-15 and R-105A/ARR-15

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	DESIG. or AWS TYPE MFR. and	CONT. or GOVT. DWG. or SPEC. No.
C-148†††	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" overall; solder lug terminals; 3 mtg lugs.	Line filter	53021 Type M-101	
C-149	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	71590 Type B831 (Special)	912 0003 00
C-149†††	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	53021 Type M-101	
C-150	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	71590 Type B831 (Special)	912 0003 00
C-150†††	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	53021 Type M-101	
C-151	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	71590 Type B831 (Special)	912 0003 00
C-151†††	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	53021 Type M-101	
C-152	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	71590 Type B831 (Special)	912 0003 00
C-152†††	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	53021 Type M-101	
C-153	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	71590 Type B831 (Special)	912 0003 00
C-153†††	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	53021 Type M-101	

C-154	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	71590 Type B831 (Special)	912 0008 00
C-154†††	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	53021 Type M-101	
C-155	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	71590 Type B831 (Special)	912 0008 00
C-155†††	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	53021 Type M-101	
C-156	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	71590 Type B831 (Special)	912 0008 00
C-156†††	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	53021 Type M-101	
C-157	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	71590 Type B831 (Special)	912 0008 00
C-157†††	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	53021 Type M-101	
C-158	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	71590 Type B831 (Special)	912 0008 00
C-158†††	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	53021 Type M-101	
C-159	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	71590 Type B831 (Special)	912 0008 00
C-159†††	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	53021 Type M-101	

* Contract N5sa-8648
** Contract N0a(s)-51-103f
ɕ Contract N0a(s)-52-961
† Contract N0a(s)-9216
*** Contract N0a(s)-51-244a
θ Contract N0a(s)-52-1027
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
• Contract N0a(s)-51-259
•• Contract N0a(s)-53-833

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: RADIO RECEIVERS R-105/ARR-15 and R-105A/ARR-15

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	DESIG. or AWS TYPE MFR. and	CONT. or GOVT. DWG. or SPEC. No.
C-160	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	71590 Type B831 (Special)	912 0008 00
C-160†††	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	53021 Type M-101	
C-161	R16-C-7865-102.	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	71590 Type B831 (Special)	912 0008 00
C-161†††	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	53021 Type M-101	
C-162	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	71590 Type B831 (Special)	912 0008 00
C-162†††	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	53021 Type M-101	
C-163	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	71590 Type B831 (Special)	912 0008 00
C-163†††	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	53021 Type M-101	
C-164	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	71590 Type B831 (Special)	912 0008 00
C-164†††	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	53021 Type M-101	
C-165	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	71590 Type B831 (Special)	912 0008 00

C-165†††	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	53021 Type M-101	
C-166	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	71590 Type B831 (Special)	912 0008 00
C-166†††	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	53021 Type M-101	
C-167	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	71590 Type B831 (Special)	912 0008 00
C-167†††	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Line filter	53021 Type M-101	
C-168	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Phone jack filter	71590 Type B831 (Special)	912 0008 00
C-168†††	R16-C-7865-102	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; .443" dia x 7/16" long overall; solder lug terminals; 3 mtg tabs.	Phone jack filter	53021 Type M-101	
C-169	R16-C-10491	CAPACITOR: Fixed; mica; dielectric; .01 mf 20%; ±20%; 300 volts dcw; 11/32" x 53/64" x 53/64"; with No. 18 AWG radial wire leads 1⅛" long.	Plate decoupling	CM35B103M	MIL-C-5 935 2118 00
C-169†††	R16-C-10491	CAPACITOR: Fixed; mica; dielectric; .01 mf 20%; ±20%; 300 volts dcw; 11/32" x 53/64" x 53/64"; with No. 18 AWG radial wire leads 1⅛" long.	Plate decoupling	CM35B103M	MIL-C-5 935 2118 00
C-170		CAPACITOR: Fixed, ceramic dielectric; 500 vdc working, 5 uuf ±½ uuf; −330 uuf/uf/°C, +60 uuf/uf/°C; tubular, 0.200 in. dia by 0.400 in. lg	Antenna coupling	CC20SH050D	JAN-C-20A 916 0328 00
C-171		CAPACITOR: Fixed, ceramic dielectric; 500 vdc working, 8 uuf ±½ uuf; −330 uuf/uf/°C, +60 uuf/uf/°C; tubular, 0.200 in. dia by 0.400 in. lg	Antenna coupling	CC20SH080D	JAN-C-20A 916 0340 00

* Contract N5sa-8648
** Contract N0a(s)-51-103f
ϕ Contract N0a(s)-52-961
† Contract N0a(s)-9216
*** Contract N0a(s)-51-244a
θ Contract N0a(s)-52-1027
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
° Contract N0a(s)-51-259
°° Contract N0a(s)-53-983

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: RADIO RECEIVERS R-105/ARR-15 and R-105A/ARR-15

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	DESIG. or AWS TYPE MFR. and	CONT. or GOVT. DWG. or SPEC. No.
C-172		CAPACITOR: Fixed, ceramic dielectric; 500 vdc working, 10 uuf ±1 uuf; −330 uuf/uf/°C, +60 uuf/uf/°C; tubular, 0.200 in. dia by 0.400 in. lg	Antenna coupling	CC20SH100F	JAN-C-20A 916 0349 00
C-173		CAPACITOR: Fixed, ceramic dielectric; 500 vdc working, 20 uuf ±5%; −330 uuf/uf/°C, +60 uuf/uf/°c; tubular, 0.200 in. dia by 0.400 in lg	Antenna coupling	CC20SH200J	JAN-C-20A 916 0363 00
C-174		CAPACITOR: Fixed, ceramic dielectric; 500 vdc working, 24 uuf ±5%; −330 uuf/uf/°C, +60 uuf/uf/°C; tubular, 0.200 in. dia by 0.400 in. lg	Antenna coupling	CC20SH240J	JAN-C-20A 916 0371 00
C-175	R5910-161-1133-F632	CAPACITOR: Fixed, ceramic dielectric; 500 vdc working, 51 uuf ±5%; −750 uuf/uf/°C, +120 uuf/uf/°C; tubular, 0.200 in. dia by 0.400 in. lg	Antenna coupling	CC20UJ510J	JAN-C-20A 916 0476 00
C-176	R16-C-8357-300	CAPACITOR: Fixed; tubular; ceramic; 200 mmf ±5%; temp coef 0 PPM/°C +30 PPM/°C —75 PPM/°C; 500 volts dcw; .415" dia x 1.300" long; radial wire leads 1¼" long.	Second i-f grid tank	CC40CG201J	JAN-C-20A 916 7007 00
C-177	R16-C-8357-300	CAPACITOR: Fixed; tubular; ceramic; 200 mmf ±5%; temp coef 0 PPM/°C +30 PPM/°C —75 PPM/°C; 500 volts dcw; .415" dia x 1.300" long; radial wire leads 1¼" long.	Second i-f plate tank	CC40CG201J	JAN-C-20A 916 7007 00
C-178* †		CAPACITOR: Fixed, ceramic dielectric; 500 vdc working, 5.0 uuf ±½ uuf; −330 uuf/uf/°C, +60 uuf/uf/°C; tubular, 0.200 in. dia by 0.400 in. lg	Second i-f det coupling	CC20SH050D	JAN-C-20A 916 0328 00
C-178†† ††† ** *** ° φθ °°	R16-C-7779-52	CAPACITOR: Fixed; tubular; ceramic (insulated); 5 mmf ±½ mmf; temp coef 0 (tol +60 —110) PPM/°C; 500 volts dcw; .250" dia x .562" lg, axial wire leads; Effective with serial #1.	Second i-f det coupling	CC21CH050D	JAN-C-20A 916 1063 00

C-179	R16-C-8357-300	CAPACITOR: Fixed; tubular; ceramic; 200 mmf ±5%; temp coef 0 PPM/°C +30 PPM/°C —75 PPM/°C; 500 volts dcw; .415" dia x 1.300" long; radial wire leads 1¼" long.	Det input tank	CC40CG201J	JAN-C-20A 916 7007 00
C-180	R13-C-8357-300	CAPACITOR: Fixed; tubular; ceramic; 200 mmf ±5%; temp coef 0 PPM/°C +30 PPM/°C —75 PPM/°C; 500 volts dcw; .415" dia x 1.300" long; radial wire leads 1¼" long.	First i-f plate tank	CC40CG201J	JAN-C-20 916 7007 00
C-181* †		CAPACITOR: Fixed, ceramic dielectric; 500 vdc working, 8 uuf ±½ uuf; —330 uuf/uf/°C, +60 uuf/uf/°C; tubular, 0.200 in. dia by 0.400 in. lg	First i-f second i-f coupling	CC20SH080D	JAN-C-20A 916 0340 00
C-181†† ††† ** *** ° φθ °°	R16-C-7860-136	CAPACITOR: Fixed; tubular; ceramic (insulated); 8 mmf ±½ mmf; temp coef 0 (tol +60 —110) PPM/°C; 500 volts dcw; .250" dia x .562" lg, axial wire leads; Effective with serial #1.	First i-f, second i-f coupling	CC21CH080D	JAN-C-20A 916 1075 00
C-182		Not used			
C-183* †	R16-C-7854-350	CAPACITOR: Fixed, ceramic dielectric; 500 vdc working, 5.0 uuf ±½ uuf; —330 uuf/uf/°C, +60 uuf/uf/°C; tubular, 0.200 in. dia by 0.400 in. lg	Mixer, first i-f coupling	CC20SH050D	JAN-C-20A 916 0328 00
C-183†† ††† ** *** φθ ° °°		CAPACITOR: Fixed; tubular; ceramic (insulated); 5 mmf ±½ mmf; temp coef 0 (tol +60 —110) PPM/°C; 500 volts dcw; .250" dia x .562" lg, axial wire leads; Effective with serial #1.	Mixer, first i-f coupling	CC21CH050D	JAN-C-20A 916 1063 00
C-184	R16-C-8357-300	CAPACITOR: Fixed; tubular; ceramic; 200 mmf ±5%; temp coef 0 PPM/°C +30 PPM/°C —75 PPM/°C; 500 volts dcw; .415" dia x 1.300" long; radial wire leads 1¼" long.	First i-f grid tank	CC40CG201J	JAN-C-20A 916 7007 00
C-185*		CAPACITOR: Fixed; paper; hermetically sealed; metallic case; three sections; 0.1 mf per section; 400 wv; +20% —10%; ¾" x 1¾" x 1-13/16".	Audio amplifier cathode by-pass	77630	954 3018 20
C-185†	R16-C-11336-66	CAPACITOR: Fixed, paper dielectric; 600 vdc working, 3 section; 0.1 uf each section, +20% —10%; ¾ in. by 1 in. by 1-13/16 in. Effective serial #329.	Audio amplifier cathode by-pass	CP53B5FF104V	MIL-C-25 961 4193 00

* Contract N5sa-8648
** Contract N0a(s)-51-103f
φ Contract N0a(s)-52-961
† Contract N0a(s)-9216
*** Contract N0a(s)-51-244a
θ Contract N0a(s)-52-1027
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
° Contract N0a(s)-51-259
°° Contract N0a(s)-53-983

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: RADIO RECEIVERS R-105/ARR-15 and R-105A/ARR-15

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	DESIG. or AWS TYPE MFR. and	CONT. or GOVT. DWG. or SPEC. No.
C-135†† °° ††† ° ** *** φθ	R16-C-11336-66	CAPACITOR: Fixed, paper dielectric; 600 vdc working; 3 section; 0.1 uf +20% −10% each section; ¾ in. by 1 in. by 1-13/16 in. Effective serial #1.	Audio amplifier cathode by-pass	CP53B5FF104V	MIL-C-25 961 4193 00
C-186* †					
C-186†† ††† ** *** φθ ° °°	R16-C-10017-24-501	CAPACITOR: Fixed; mica dielectric; 470 mmf ±20%; 500 volts dcw; 7/32" x 15/32" x 51/64", radial wire leads; Effective with serial #1.	avc cathode by-pass	CM20B471M	MIL-C-5 935 0135 00
C-187* †		Not used.			
C-187†† ††† ** *** φθ ° °°	R16-C-10017-24-501	CAPACITOR: Fixed; mica dielectric; 470 mmf ±20%; 500 volts dcw; 7/32" x 15/32" x 51/64", radial wire leads; Effective with serial #1.	AVC cathode by-pass	CM20B471M	MIL-C-5 935 0135 00
C-188* †		Not used.			
C-188†† ††† ** *** φθ ° °°	R16-C-9997-36	CAPACITOR: Fixed; mica dielectric; 330 mmf ±10%; 500 volts dcw; temp coef letter C; 51/64" lg x 15/32" wd x 7/32" thk, axial wire leads; Effective with serial #1.	Detector load by-pass	CM20C331K	MIL-C-5 935 0208 00
C-189* †		Not used.			
C-189†† φ ††† θ ** °° *** °	R16-C-10491	CAPACITOR: Fixed; mica dielectric; .01 mf ±20%; 300 volts dcw; 11/32" x 53/64" x 53/64", radial wire leads; Effective with serial #1.	Audio driver cathode by-pass	CM35B103M	MIL-C-5 935 2118 00
C-190* † †† †††		Not used.			

C-190** *** ° φθ °°	R16-C-10491	CAPACITOR: Fixed; mica dielectric; .01 mf ±20%; 300 volts dcw; 11/32" x 53/64" x 53/64" with No. 18 AWG radial wire leads.	R-f by-pass	CM35B103M	MIL-C-5 935 2118 00
CR-101*	16-T-51734	CRYSTAL: Diode; Germanium; 0-100 mc; 50 v; 0-22.5 ma; 9/32" dia ¾" long; radial wire leads 1½" long.	Crystal detector	90139 Type 1N34	353 0003 00
CR-101†	16-T-51734	CRYSTAL: Diode; Germanium; 0-300 mc; 100 v; 0-22.5 ma; 9/32" dia ¾" long; axial wire leads 1½" long; Effective with serial #329.	Crystal detector	90139 Type 1N38	353 0022 00
CR-101†† *** ††† ° ** φθ °°		Not used; Effective with #1.			
E-101	R5800-C03-3681-FCRC	BOARD TERMINAL: 8 silver plated brass, staked terminal pins; ⅝" wide x 1.78" long x 3/32" thick; laminated phenolic; type LTS-E-2 (JAN-P-13).	Internal wiring cable connector	13499	502 4464 002
E-101†††	R5800-C03-3681-FCRC	BOARD TERMINAL: 8 silver plated brass, staked terminal pins; ⅝" wide x 1.78" long x 3/32" thick; laminated phenolic; type LTS-E-4 (JAN-P-13).	Internal wiring cable connector	82066 Part #120725	120725†††
E-102* †	R5970-117-5189-FCRC	INSULATOR: White isolantite; ¼" dia x ⅝" long; tapped 4-40 NC-2 x 3/16" deep in each end.	Internal wiring cable connector	13499	190 1105 00
E-102†† *** ** ° φθ °°		Not used. Effective with serial #1.			
E-102†††		INSULATOR: White isolantite; ⅜" dia x ⅝" lg; tapped 6-32 x ¼" deep each end.	Internal wiring cable connector	76626, Part #NS4W0105	
E-103	R5940-155-7079-FCRC	BOARD TERMINAL: 4 silver plated brass, staked terminal pins; 1¼" wide x 1½" long x 3/32" thick with hole 13/16" x 15/16"; laminated phenolic type LTS-E-2 (JAN-P-13).	Mounts R-110, R-111, C-118 and C-120	13499	502 6997 002
E-103†††	R5940-155-7079-FCRC	BOARD TERMINAL: 4 silver plated brass staked terminal pins; 1¼" wide x 1½" long x 3/32" thick with hole 13/16" x 15/16"; laminated phenolic type LTS-E-2 (JAN-P-13).	Mounts R-110, R-111, C-118 and C-120	82066 Part #120534	120534†††
E-104* †	R5940-155-7066-FCRC	BOARD TERMINAL: 4 silver plated brass staked terminal pins; 1¼" wide x 1½" long x 3/32" thick with hole 13/16" x 15/16"; laminated phenolic type LTS-E-2 (JAN-P-13).	Mounts R-115, R-116, C-123 and C-124	13499	502 6996 002

* Contract N5sa-8648
** Contract N0a(s)-51-103f
φ Contract N0a(s)-52-961
† Contract N0a(s)-9216
*** Contract N0a(s)-51-244a
θ Contract N0a(s)-52-1027
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
° Contract N0a(s)-51-259
°° Contract N0a(s)-53-983

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: RADIO RECEIVERS R-105/ARR-15 and R-105A/ARR-15

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	DESIG. or AWS TYPE MFR. and	CONT. or GOVT. DWG. or SPEC. No.
E-104†† *** °° ** ° φθ		Not used: Effective with serial #1.			
E-104†††	R5940–155–7066–FCRC	BOARD TERMINAL: 4 silver plated brass, staked terminal pins; 1¼" wide x 1½" long x 3/32" thick with hole 13/16" x 15/16"; laminated phenolic LTS-E-4 (JAN-P-13).	Mounts R-115, R-116, C-123 and C-124	82066 Part #120540	120540†††
E-105	R5821–562–3568–FCRC	BOARD TERMINAL: 4 silver plated brass, staked terminal pins; 1¼" wide x 1½" long x 3/32" thick with hole 13/16" x 15/16"; laminated phenolic type LTS-E-2 (JAN-P-13).	Mounts R-107, R-108 and R-137	13499	502 7002 002
E-105†††	R5821–562–3568–FCRC	BOARD TERMINAL: 4 silver plated brass, staked terminal pins; 1¼" wide x 1½" long x 3/32" thick with hole 13/16" x 15/16"; laminated phenolic type LTS-E-4 (JAN-P-13).	Mounts R-107, R-108 and R-137	82066 Part #120718	120718†††
E-106	R5940–155–7070–FCRC	BOARD TERMINAL: 4 silver plated brass, staked terminal pins; 1¼" wide x 1½" long x 3/32" thick with hole 13/16" x 15/16"; laminated phenolic type LTS-E-2 (JAN-P-13).	Mounts R-102, R-103, C-103, C-104	13499	502 7003 002
E-106†††	R5940–155–7070–FCRC	BOARD TERMINAL: 4 silver plated brass, staked terminal pins; 1¼" wide x 1½" long x 3/32" thick with hole 13/16" x 15/16"; laminated phenolic type LTS-E-4 (JAN-P-13).	Mounts R-102, R-103, C-103, C-104	82066 Part #120626	120626†††
E-107	R5940–155–7068–FCRC	BOARD TERMINAL: 4 silver plated brass, staked terminal pins: 1¼" wide x 1½" long x 3/32" thick with hole 13/16" x 15/16"; laminated phenolic type LTS-E-2 (JAN-P-13).	Mounts R-105, R-106 and C-116	13499	502 7001 002
E-107†††	R5940–155–7068–FCRC	BOARD TERMINAL: 4 silver plated brass, staked terminal pins; 1¼" wide x 1½" long x 3/32" thick with hole 13/16" x 15/16"; laminated phenolic type LTS-E-4 (JAN-P-13).	Mounts R-106, C-110 and C-116	82066 Part #120627	120627†††
E-108	R5940–155–7064–FCRC	BOARD TERMINAL: 4 silver plated brass, staked terminal pins; 1¼" wide x 1½" long x 3/32" thick with hole 13/16" x 15/16"; laminated phenolic type LTS-E-2 (JAN-P-13).	Mounts R-114, R-136, C-137, C-140	13499	502 7000 002

E-108†††	R5940-155-7064-FCRC	BOARD TERMINAL: 4 silver plated brass, staked terminal pins; 1¼" wide x 1½" long x 3/32" thick with hole 13/16" x 15/16"; laminated phenolic type LTS-E-4 (JAN-P-13).	Mounts R-114, R-136, C-137, C-140	82066 Part #120628	120628†††
E-109	R5800-C03-3810-FCRC	BOARD TERMINAL: 4 silver plated brass, staked terminal pins; 1¼" wide x 1½" long x 3/32" thick with hole 13/16" x 15/16"; laminated phenolic type LTS-E-2 (JAN-P-13).	Mounts R-135, R-138, C-136, C-138	13499	502 6999 002
E-109†††	R5800-C03-3810-FCRC	BOARD TERMINAL: 4 silver plated brass, staked terminal pins; 1¼" wide x 1½" long x 3/32" thick with hole 13/16" x 15/16"; laminated phenolic type LTS-E-4 (JAN-P-13).	Mounts R-135, R-138, C-136, C-138	82066 Part #120625	120625†††
E-110	R5940-545-8670-FCRC	BOARD TERMINAL: 4 staked terminal pins; 1¼" wide x 1¼" long x 3/32" thick with hole 13/16" x 15/16; laminated phenolic type LTS-E-2 (JAN-P-13).	Test board mounts R-131 and C-125	13499	502 4463 002
E-110†††	R5940-545-8670-FCRC	BOARD TERMINAL: 4 staked terminal pins; 1¼" wide x 1¼" long x 3/32" thick with hole 13/16" x 15/16; laminated phenolic type LTS-E-2 (JAN-P-13).	Test board mounts R-131 and C-125	82066 Part #120533	120533†††
E-111*	R16-CR-502-4470-003	BOARD TERMINAL: 31 silver plated brass, staked terminal pins; 2⅜" wide x 6½" long x 3/32" thick with holes ⅜" x 1-7/16"; laminated phenolic type LTS-E-2 (JAN-P-13).	Audio board mounts R-121, R-122, R-124, R-125, R-127, R-123, R-128, R-132, R-133, R-134, C-130, C-133, C-134, C-135	13499	502 4470 003
E-111† ** †† *** ††† ° φθ °°		Not used.			
E-112	R5940-155-7067-FCRC	BOARD TERMINAL: 4 silver plated brass, staked terminal pins; 1¼" wide x 1½" long x 3/32" thick with hole 13/16" x 15/16"; laminated phenolic type LTS-E-2 (JAN-P-13).	Mounts R-109, R-112, C-117	13499	502 6995 002
E-112†††	R5940-155-7067-FCRC	BOARD TERMINAL: 4 silver plated brass, staked terminal pins; 1¼" wide x 1½" long x 3/32" thick with hole 13/16" x 15/16"; laminated phenolic type LTS-E-4 (JAN-P-13).	Mounts R-109, R-112, C-117, C-121	82066 Part #120535	120535†††
E-113	R5940-433-7314-FCRC	BOARD TERMINAL: 12 band switch terminal pins and two contact rod supports; 3" wide x 5" long x 3/32" thick; laminated phenolic type LTS-E-2 (JAN-P-13).	r-f band pass terminal board, stator contacts for S-101C and S-101D	13499	502 6902 002

* Contract N5sa-8648
** Contract N0a(s) [illegible]1-103f
φ Contract N0a(s)-52-961
† Contract N0a(s)-9216
*** Contract N0a(s)-51-244a
θ Contract N0a(s)-52-1027
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
° Contract N0a(s)-51-259
°° Contract N0a(s)-53-933

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: RADIO RECEIVERS R-105/ARR-15 and R-105A/ARR-15

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	DESIG. or AWS TYPE MFR. and	CONT. or GOVT. DWG. or SPEC. No.
E-113†††	R5940–433–7314–FCRC	BOARD TERMINAL: 12 band switch terminal pins and two contact rod supports; 3" wide x 5" long x 3/32" thick; laminated phenolic type LTS-E-4 (JAN-P-13).	r-f band pass terminal board, stator contacts for S-101C and S-101D	82066 Part #121303	121303†††
E-114	R5940–433–7311–FCRC	BOARD TERMINAL: Ant board; 12 band switch terminal pins and 2 contact rod supports; 2¼" wide x 3" long x 3/32" thick; laminated phenolic type LTS-E-2 (JAN-P-13).	Antenna terminal board and stator contacts of S-101A	13499	502 6898 002
E-114†††	R5940–433–7311–FCRC	BOARD TERMINAL: Ant board; 12 band switch terminal pins and 2 contact rod supports; 2¼" wide x 3" long x 3/32" thick; laminated phenolic type LTS-E-4 (JAN-P-13).	Antenna terminal board and stator contacts of S-101A	82066 Part #121307	121307†††
E-115	R5940–164–4253–FCRC	BOARD TERMINAL: Exciter board; 6 band switch terminal pins and contact rod support; 3" wide x 1½" long x 3/32" thick; laminated phenolic type LTS-E-2 (JAN-P-13).	Multiplier terminal board and stator contacts of S-101E	13499	502 6729 002
E-115†††	R5940–164–4253–FCRC	BOARD TERMINAL: Exciter board; 6 band switch terminal pins and contact rod support; 3" wide x 1½" long x 3/32" thick; laminated phenolic type LTS-E-4 (JAN-P-13).	Multiplier terminal board and stator contacts of S-101E	82066 Part #121276	121276†††
E-116	R5940–143–0862–FCRC	BOARD TERMINAL: 2 silver plated brass, staked terminal pins; 13/16" wide x 1½" long x 3/32" thick; with 19/32" x 15/16" recess; laminated phenolic type LTS-E-2 (JAN-P-13).	Mounts R-104 C-169	13499	502 4469 002
E-116†††	R5940–143–0862–FCRC	BOARD TERMINAL: 2 silver plated brass, staked terminal pins; 13/16" wide x 1½" long x 3/32" thick; with 19/32" x 15/16" recess; laminated phenolic type LTS-E-4 (JAN-P-13).	Mounts R-104, C-169	82066 Part #120717	120717†††
E-117	R5940–155–7075–FCRC	BOARD TERMINAL: 4 staked terminal pins; 1¼" wide x 1½" long x 3/32" thick with hole 3/16" x 15/16"; laminated phenolic type LTS-E-2 (JAN-P-13).	Mounts R-113, R-117, C-122, C-126	13499	502 6998 002
E-117†††	R5940–155–7075–FCRC	BOARD TERMINAL: 4 staked terminal pins; 1¼" wide x 1½" long x 3/32" thick with hole 3/16" x 15/16"; laminated phenolic type LTS-E-4 (JAN-P-13).	Mounts R-113, R-117, C-122, C-126	82066 Part #120536	120536†††

E-118	R5915-153-5675-E111	BRUSH: Electrical contact, carbon, positive and negative for 502 6914 002 motor; .185" x .250" x 21/64"; complete with pigtail lead and spring for B-101.	Replacement for AUTOTUNE motor B-101	20418 Cat. 95600-A	234 0054 00
E-118†††	R16-B-12321-101	BRUSH: Electrical contact, carbon, positive and negative for B-120767 motor; 0.185" x 0.250" x 21/64"; complete with pigtail spring for B-101.	Replacement for AUTOTUNE motor B-101	82066 Part #122569	122569†††
E-119	R5977-252-6331-E212	BRUSH HOLDER CAP: positive and negative, for 502 6914 002 motor, B-101; .593" dia x ¼" x 7/16" -27NS-2 thd.	Replacement for AUTOTUNE motor B-101	20418 Cat. 95598-A	234 0055 00
E-119†††	R17-C-2952-3	BRUSH HOLDER CAP: positive and negative, for B-120767 motor, B-101, ⅜"-32 x ¼" thd x 9/16" dia c/a.	Replacement for AUTOTUNE motor B-101	82066 Part #122570	122570†††
E-119A	R5977-238-6778-E111	BRUSH HOLDER: Upper for 502 6914 002 motor, for B-101, .613" dia x 7/16" -27NS-2 thd, with two lugs.	Replacement for AUTOTUNE motor B-101	20418 Cat. 98500-A	234 0102 00
E-119B	R5820-497-0090-E111	BRUSH HOLDER: Lower for 502 6914 002 motor, for B-101, .613" dia x 7/16" -27NS-2 thd, with two lugs.	Replacement for AUTOTUNE motor B-101	20418 Cat. 98100-A	234 0144 00
E-119B†††	R16-H-6399	BRUSH HOLDER: Upper and lower for B120767 motor, B-101; ⅜" -32 x ¼" thd.	Replacement for AUTOTUNE motor B-101	82066 Part #122571	122571†††
E-120		Not used.			
E-121	R5950-433-7312-FCRC	CORE: powdered iron; ¼" dia x 1" long; complete with adj threaded sleeve; 5/16" dia x 2-15/16" long max overall.	r-f tuning core	13499 82066 Part #120748	502 6899 002 120748†††
E-122	R5950-433-7313-FCRC	CORE: powdered iron; ¼" dia x 1⅜" long; complete with adj threaded sleeve; 5/16" dia x 2-15/16" long max overall.	i-f tuning core	13499 82066 Part #120587	502 6900 002 120587†††
E-123	R5325-276-4221-GB90	GROMMET: 11/16" OD; 13/32" ID x ¼" thick neoprene rubber.	Internal wiring cable abrasion protector	75543	201 1080 00
E-124	R5355-431-9821-E111	KNOB: round black phenolic for .187" dia shaft; two 6-40 NF-2 set screws; 1¼" dia x 9/16" thick; brass insert; shaft hole ⅜" deep; fine straight knurl.	Calibrate knob	13499 82066 Part #121401	502 6674 002 121401†††

* Contract N5sa-8648 † Contract N0a(s)-9216 †† Contract N0a(s)-9972 ††† Contract N0a(s)-10901
** Contract N0a(s)-51-103f *** Contract N0a(s)-51-244a ° Contract N0a(s)-51-259
ϕ Contract N0a(s)-52-961 θ Contract N0a(s)-52-1027 °° Contract N0a(s)-53-983

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: RADIO RECEIVERS R-105/ARR-15 and R-105A/ARR-15

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	DESIG. or AWS TYPE MFR. and	CONT. or GOVT. DWG. or SPEC. No.
E-125	R5355-431-9822-E111	KNOB: round black phenolic for 1/4" dia shaft; two 6-40 NF-2 set screws; 1-1/4" dia x 9/16" thick; brass insert; shaft hole 3/8" deep; fine straight knurl.	Gain control knob	13499 82066 Part #121402	502 6675 002 121402†††
E-126	R5355-431-9823-E111	KNOB: round black phenolic for .343" dia shaft; two 6-40 NF-2 set screws; 1½" dia x 9/16" thick; brass insert shaft hole 3/8" deep; fine straight knurl.	Band switch knob	13499 82066 Part #121399	502 6676 002 121399†††
E-127	R5355-424-9372-E111	KNOB: round black phenolic for 1/4" dia shaft; two 6-40 NF-2 set screws; shaft hole 3/8" deep; fine straight knurl, with handle 15/16" long.	Tuning knob	13499 82066 Part #121400	502 6938 002 121400†††
E-128	R5355-503-1698-E111	KNOB: Wing; Alcoa alloy; black anodized finish; for 1/4" dia shaft; two 6-40 NF-2 set screws; shaft hole 7/16" deep.	Channel and emission selector switch knobs	13499 82066 Part #121403	502 4731 002 121403†††
E-129	R5355-667-7155-E111	KNOB: Wing; 17ST Aluminum alloy; black anodized finish; for 1/4" dia shaft; two 6-40 NF-2 set screws; shaft hole .406" deep, 15/16" dia x 9/16" max overall.	Power switch knob	13499	502 4732 002
E-129†††	R5355-667-7155-E111	KNOB: round; 17ST Aluminum alloy; black anodized finish; for 1/4" shaft; two 6-40 NF-2 set screws; shaft hole 0.406" deep, 15/16" dia x 9/16" thk; engraved "Push to Release."	Power switch knob	82066 Part #121352	121352†††
E-130	R5995-433-7322-FCRC	LEAD: Test; 7" insulated wire lead with 10,000 ohm resistor; banana plug terminal.	Alignment of Z-119 and Z-120	13499	502 6933 002
E-130†††		LEAD: Test; 7" insulated wire lead with 3,300 ohm resistor; banana plug terminal.	Alignment of Z-119 and Z-120	82066 Part #120532	120532†††
E-131	R6150-093-6019-FCRC	LEAD: Connector; insulated wire lead 2¾" long w/banana plug terminals.	cfi relay unit	13499 82066 Part #120562	502 6943 002 120562†††
E-132	R42-I-392	SHOCKMOUNT: 3/8" x 3/8" x 29/32" overall; including 8-32 NC-2 studs; 3/8" long on each end; max static load 4 lbs.	Dynamotor shock-mount	97487 A321 (Special) 82066 Part #121433	200 0008 00 121433†††
E-133*	R17-H-5985-15	SOCKET: bracket for two bayonet base lamps; Mazda #313; 3-1/16" x 7/8" x 1-3/8" max overall; brass; silver plated.	Dial light socket	13499	502 4616 002

E-133† *** †† ° ** °° ϕ θ	R6250-473-8057-E111	SOCKET: bracket for two bayonet base lamps Mazda #313; 3-1/6" x ⅞" x 1⅜" max overall; brass, silver plated; insulated; Effective with serial #329.	Dial light	13499	503 4861 002
E-133†††	R6250-473-8057-E111	SOCKET: bracket for two bayonet lamps; part of Autotune motor assy, JHB #121431.	Dial light	82066 Part #120572	120572†††
E-134* †		Not used.			
E-134†† *** ††† ° ** °° ϕ θ	R5940-204-9304-D446	BOARD: Terminal; 16 brass cad plated staked terminal pins; 1½" wide x 2¾" long x 13/32" thick; laminated phenolic type LTS-E-4; Effective with serial #1.	Mounts R-122, R-124, R-127, R-130, R-132, R-134, R-152, R-153.	13499 82066 Part #120550	503 8334 001 120550†††
E-135* †		Not used.			
E-135†† °° ††† ** *** ° ϕ θ	R5940-204-9410-D446	BOARD: Terminal; 4 brass cad plated staked terminal pins; 1¼" wide x 1½" long x 13/32" thick with holes 3/16" x 1¼"; laminated phenolic type LTS-E-4; Effective with serial #1.	Mounts R-121, R-125, R-155, C-121	13499 82066 Part #120541	503 8335 001 120541†††
E-136* †		Not used.			
E-136†† °° ††† ** *** ° ϕ θ	R5940-204-9332-D446	BOARD: Terminal; 4 brass cad plated staked terminal pins; 1½" wide x 1½" long x 13/32" thick with holes 3/16" x 1¼"; laminated phenolic type LTS-E-4; Effective with serial #1.	Mounts C-130, C-134	13499 82066 Part #120542	503 8337 001 120542†††
E-137†††		BOARD TERMINAL: Two silver pl brass term; 13/16" wd x 1½" lg x 3/32" thk; w/19/32" recess; lam phenolic type LTS-E-4 (JAN-P-13).	Mounts R-101, C-102	82066 Part #120711	120711†††
E-138†††	R16-S-9253	STRIP, grounding: phosphor bronze, silver plated, 2-9/16" x ½" x ½" o/a.	Grounds band switch covers	82066 Part #120567	120567†††
H-101	R5805-281-2616-FCRC	SCREW: Special; 4-40 thread with knurled head.	Secures cfi connector	13499 82066 Part #120798	502 6617 002 120798†††
H-102	R41-S-1176-29	SCREWDRIVER: Special; 90° angle; Phillips No. 1 point on each end.	Maintenance tool	79061	024 3000 00
H-103	R5840-433-7320-FCRC	WICK: Lubricator; 9/16" x 1" x 1¼" max o/a.	Lubricates multiturn worm	13499	502 6912 002

* Contract N5sa-8648
** Contract N0a(s)-51-103f
ϕ Contract N0a(s)-52-961
† Contract N0a(s)-9216
*** Contract N0a(s)-51-244a
θ Contract N0a(s)-52-1027
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
° Contract N0a(s)-51-259
°° Contract N0a(s)-53-983

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: RADIO RECEIVERS R-105/ARR-15 and R-105A/ARR-15

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	DESIG. or AWS TYPE MFR. and	CONT. or GOVT. DWG. or SPEC. No.
H-103†††		WICK: Lubricator; ½" x 5/16 x ¾" max o/a.	Lubricates multiturn worm	82066 Part #120694	120694†††
H-104	R5840-433-7319-FCRC	WICK: Lubricator; .62" x .87" x 1.0" max o/a.	Lubricates singleturn worm	13499	502 6910 00
H-104†††		WICK: Lubricator; ½" x 5/16 x ¾" max o/a.	Lubricates singleturn worm	82066 Part #120694	120694†††
H-105	R4930-300-3465-FCRC	WICK: Lubricator; 9/16" x ¾" x 15/16" max o/a.	Lubricates control unit worm	13499	502 6909 002
H-105†††		WICK: Lubricator; ½" x 5/16 x ¾" max o/a.	Lubricates control unit worm	82066 Part #120694	120694†††
H-106	R5120-249-9670	WRENCH: multiple spline for No. 6 Bristo set screws; hardened steel.	Maintenance tool	08664	024 9730 00
H-107	R5120-224-2482	WRENCH: multiple spline for No. 10 Bristo set screws; hardened steel.	Maintenance tool	08664	024 9710 00
H-108	R5840-433-7298-FCRC	WRENCH: tuning; insulated screwdriver; 9/32" dia x 3/32" long max overall.	Alignment tool	13499 82066 Part #120571	502 6637 002 120571†††
I-101	R17-L-6682	LAMP, INCANDESCENT: 28 v; .17 amp; clear; min bayonet base.	Provides dial illumination	99142 Cat. 313	262 3270 00
I-102	R17-L-6682	LAMP, INCANDESCENT: 28 v; .17 amp; clear; min bayonet base.	Provides dial illumination	99142 Cat. 313	262 3270 00
J-101	R5940-147-5346-E121	CONNECTOR: Single terminal push type binding post; ⅜" dia x 1-1/16" max overall; ½" long stud; 4-40 NC-2 thd.	ANTENNA connector	72825 82066 Part #120636	372 1003 00 120636†††
J-102	R5935-433-7301-FCRC	CONNECTOR: Female; 8 terminal receptacle plate; 1" wide x 1-13/16" long x 11/32" thick max overall; laminated phenolic type LTS-E-2 (JAN-P-13)	RELAY UNIT connector	13499	502 6687 002
J-102†††	R5935-433-7301-FCRC	CONNECTOR: Female; 8 terminal receptacle plate; 1" wide x 1-13/16" long x 11/32" thick max overall; laminated phenolic type LTS-E-4 (JAN-P-13).	RELAY UNIT connector	82066 Part #120721	120721†††

J-103	R5820-433-7299-FCRC	CONNECTOR: Female; 2 terminal receptacle plate; 1-1/16" dia x 11/32" thick overall; laminated phenolic type LTS-E-2 (JAN-P-13).	RELAY UNIT connector	13499	502 6638 002
J-103†††	R5820-433-7299-FCRC	CONNECTOR: Female; 2 terminal receptacle plate; 1-1/16" dia x 11/32" thick overall; laminated phenolic type LTS-E-4 (JAN-P-13).	RELAY UNIT connector	82066 Part #120774	120774†††
J-104		Not used.			
J-105	R5935-323-0387-FCRC	CONNECTOR: Female; 4 terminal receptacle plate; 3/8" wide x 1 5/8" long x 5/16" thick max overall; laminated phenolic type LTS-E-2 (JAN-P-13).	lf oscillator connector	13499	502 6686 002
J-105†††	R5935-323-0387-FCRC	CONNECTOR: Female; 4 terminal receptacle plate; 3/8" wide x 1 5/8" long x 5/16" thick max overall; laminated phenolic type LTS-E-4 (JAN-P-13).	lf oscillator connector	82066 Part #120630	120630†††
J-106	R5940-315-3575-FCRC	CONNECTOR: Female; 2 terminal receptacle plate; 5/16" x 3/8" x 1 1/8" max overall; laminated phenolic LTS-E-2 (JAN-P-13) with 6-32 knurled head retaining screw.	cfi unit connector	13499	502 4456 002
J-106†††	R5940-315-3575-FCRC	CONNECTOR: Female; 2 terminal receptacle plate; 5/16" x 3/8" x 1 1/8" max overall; laminated phenolic LTS-E-4 (JAN-P-13) with 6-32 knurled head retaining screw.	cfi unit connector	82066 Part #120720	120720†††
J-107	R5935-323-0387-FCRC	CONNECTOR: Female; 4 terminal receptacle plate; 3/8" wide x 1 5/8" long x 5/16" thick max overall; laminated phenolic type LTS-E-2 (JAN-P-13).	hf oscillator connector	13499	502 6686 002
J-107†††	R5935-323-0387-FCRC	CONNECTOR: Female; 4 terminal receptacle plate; 3/8" wide x 1 5/8" long x 5/16" thick max overall; laminated phenolic type LTS-E-4 (JAN-P-13).	hf oscillator connector	82066 Part #120630	120630†††
J-108	R5935-237-9690-FCRC	CONNECTOR: Female; 3 terminal receptacle plate; 1 1/2" x 1 1/2" x 1 1/4" max overall; laminated phenolic type LTS-E-2 (JAN-P-13).	Dynamotor connector	13499	502 6764 002
J-108†††	R5935-237-9690-FCRC	CONNECTOR: Female; 3 terminal receptacle plate; 1 1/2" x 1 1/2" x 1 1/4" max overall; laminated phenolic type LTS-E-4 (JAN-P-13).	Dynamotor connector	82066 Part #120629	120629†††

* Contract N5sa-8648 † Contract N0a(s)-9216 †† Contract N0a(s)-9972 ††† Contract N0a(s)-10901
** Contract N0a(s)-51-103f *** Contract N0a(s)-51-244a ° Contract N0a(s)-51-259
ϕ Contract N0a(s)-52-961 θ Contract N0a(s)-52-1027 °° Contract N0a(s)-53-983

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: RADIO RECEIVERS R-105/ARR-15 and R-105A/ARR-15

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	DESIG. or AWS TYPE MFR. and	CONT. or GOVT. DWG. or SPEC. No.
J-109	R5935–433–7247–FCRC	CONNECTOR: Female; 22 terminal receptacle plate; 11/16" x 3-11/16" x 5/16" max overall; laminated phenolic type LTS-E-2 (JAN-P-13).	LINE FILTER UNIT connector	13499	502 4460 002
J-109†††	R5935–433–7247–FCRC	CONNECTOR: Female; 22 terminal receptacle plate; 11/16" x 3-11/16" x 5/16" max overall; laminated phenolic type LTS-E-4 (JAN-P-13).	LINE FILTER UNIT connector	82066 Part #120517	120517†††
J-110	R5935–433–7246–FCRC	CONNECTOR: Female; 23 terminal receptacle plate; 1¼" wide x 1-11/16" long x ¼" thick max overall; laminated phenolic type LTS-E-2 (JAN-P-13).	AUTOTUNE casting connector	13499	502 4457 002
J-110†††	R5935–433–7246–FCRC	CONNECTOR: Female; 23 terminal receptacle plate; 1¼" wide x 1-11/16" long x ¼" thick max overall; laminated phenolic type LTS-E-4 (JAN-P-13).	AUTOTUNE casting connector	82066 Part #120726	120726†††
J-111 †††	R5935–433–7317–FCRC R16–BNL–121213	JACK: Phone; 2-5/16" long; ⅝" dia; C-168 and L-127.	Headphones connector	13499 82066 Part #121213	502 6907 002 121213†††
J-112	R5940–305–2315–FCRC	CONNECTOR: Female; 16 terminal receptacle plate; 1.5" wide x 1.93" long x 5/16" thick; max overall; laminated phenolic type LTS-E-2 (JAN-P-13).	AUTOTUNE control unit connector	13499	502 4554 002
J-112†††	R5940–305–2315–FCRC	CONNECTOR: Female; 16 terminal receptacle plate; 1.5" wide x 1.93" long x 5/16" thick; max overall; laminated phenolic type LTS-E-4 (JAN-P-13).	AUTOTUNE control unit connector	82066 Part #120574	120574†††
K-101	R5945–250–6910–E121	RELAY: single pole; normally open; double break; 1-3/32" x 1⅝" x 1½" high max overall; contact 40 amp surge starting; 15 amp continuous at 26.5 v dc coil voltage 26.5 v nom; two mounting holes in end tapped 4–40 NC–2.	Primary power control	77523 82066 Part #122579	972 1009 00 122579†††
K-102 †††	R5945–204–9641–E121 R16–BNL–122580	RELAY: (1B) one pole normally closed; 29/32" x 1-1/18" x 2-1/16" high; coil voltage 26.5 v nom; two mounting holes in end tapped 4–40 NC–2.	Receiver disabling	77523 82066 Part #122580	972 1011 00 122580†††
K-103		RELAY: Part of Autotune control unit O-147.	Motor starting relay		

L-101	R5950–234–4361–FCRC	COIL: r-f; 38T of No. 28 double enam copper wire; ⅜" dia x 1-15/16" long max overall.	Multiplier plate tank	13499 82066 Part #121347	502 6731 002 121347†††
L-102	R5950–561–3148–FCRC	COIL: Filter Choke; .85 hy —0 +20%; .1 amp; 100 ohm dc; 1-13/32" x 1-21/32" x 1-21/32" with 2⅜" mtg flange; ¾" long solder lug terminals on bottom; hermetically sealed.	High voltage filter	97965 82066 Part #121257	678 0035 00 121257†††
L-103	R5950–228–8180–FCRC	COIL: r-f Choke; 3.3 μh; 48T of No. 16 AWG enam copper wire; ⅝" dia x 2⅝" max overall; phenolic tube core over machine screw with 6-32 NC-2 thd.	Low voltage input filter	72354	240 0027 00
L-104	R5950–228–8180–FCRC	COIL: r-f Choke; 3.3 μh; 48T of No. 16 AWG enam copper wire; ⅝" dia x 2⅝" max overall: phenolic tube core over machine screw with 6-32 NC-2 thd.	Low voltage input filter	72354	240 0027 00
L-105	R5950–250–8733–FCRC	COIL: r-f Choke; 9μh; spiral wound of No. 16 AWG enam copper wire; ⅝" dia x 1-23/32" long overall; Aladdin #520 powdered iron core; .2" dia x ⅞" long with No. 16 wire leads moulded into ends.	Control and power lead filter	72354	240 0026 00
L-106	R5950–237–1532–FCRC	COIL: r-f Choke; 400 μh; 4 pie 60 T/pie; universal wound of No. 30 AWG SSE copper wire; 3 mmf dist capacity; ⅜" dia x 1-1/16" overall; Aladdin #520 powdered iron core; .2" dia x ⅞" long with No. 16 wire leads moulded into ends.	Control and power lead filter	78272 82066 Part #121392	240 0023 00 121392†††
L-107	R5950–237–1532–FCRC	COIL: r-f Choke; 400 μh; 4 pie 60 T/pie; universal wound of No. 30 AWG SSE copper wire; 3 mmf dist capacity; ⅜" dia x 1-1/16" overall; Aladdin #520 powdered iron core; .2" dia x ⅞" long with No. 16 wire leads moulded into ends.	Control and power lead filter	78272 82066 Part #121392	240 0023 00 121392†††
L-108	R5950–237–1532–FCRC	COIL: r-f Choke; 400 μh; 4 pie 60 T/pie; universal wound of No. 30 AWG SSE copper wire; 3 mmf dist capacity; ⅜" dia x 1-1/16" overall; Aladdin #520 powdered iron core; .2" dia x ⅞" long with No. 16 wire leads moulded into ends.	Control and power lead filter	78272 82066 Part #121392	240 0023 00 121392†††
L-109	R5950–237–1532–FCRC	COIL: r-f Choke; 400 μh; 4 pie 60 T/pie; universal wound of No. 30 AWG SSE copper wire; 3 mmf dist capacity; ⅜" dia x 1-1/16" overall; Aladdin #520 powdered iron core; .2" dia x ⅞" long with No. 16 wire leads moulded into ends.	Control and power lead filter	78272 82066 Part #121392	240 0023 00 121392†††

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θ Contract N0a(s)-52-1027
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
° Contract N0a(s)-51-259
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TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: RADIO RECEIVERS R-105/ARR-15 and R-105A/ARR-15

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	DESIG. or AWS TYPE MFR. and	CONT. or GOVT. DWG. or SPEC. No.
L-110	R5950-237-1532-FCRC	COIL: r-f Choke; 400 μh; 4 pie 60 T/pie; universal wound of No. 30 AWG SSE copper wire; 3 mmf dist capacity; ⅜" dia x 1-1/16" overall; Aladdin #520 powdered iron core; .2" dia x ⅞" long with No. 16 wire leads moulded into ends.	Control and power lead filter	78272 82066 Part #121392	240 0023 00 121392†††
L-111	R5950-237-1532-FCRC	COIL: r-f Choke; 400 μh; 4 pie 60 T/pie; universal wound of No. 30 AWG SSE copper wire; 3 mmf dist capacity; ⅜" dia x 1-1/16" overall; Aladdin #520 powdered iron core; .2" dia x ⅞" long with No. 16 wire leads moulded into ends.	Control and power lead filter	78272 82066 Part #121392	240 0023 00 121392†††
L-112	R5950-237-1532-FCRC	COIL: r-f Choke; 400 μh; 4 pie 60 T/pie; universal wound of No. 30 AWG SSE copper wire; 3 mmf dist capacity; ⅜" dia x 1-1/16" overall; Aladdin #520 powdered iron core; .2" dia x ⅞" long with No. 16 wire leads moulded into ends.	Control and power lead filter	78272 82066 Part #121392	240 0023 00 121392†††
L-113	R5950-237-1532-FCRC	COIL: r-f Choke; 400 μh; 4 pie 60 T/pie; universal wound of No. 30 AWG SSE copper wire; 3 mmf dist capacity; ⅜" dia x 1-1/16" overall; Aladdin #520 powdered iron core; .2" dia x ⅞" long with No. 16 wire leads moulded into ends.	Control and power lead filter	78272 82066 Part #121392	240 0023 00 121392†††
L-114	R5950-237-1532-FCRC	COIL: r-f Choke; 400 μh; 4 pie 60 T/pie; universal wound of No. 30 AWG SSE copper wire; 3 mmf dist capacity; ⅜" dia x 1-1/16" overall; Aladdin #520 powdered iron core; .2" dia x ⅞" long with No. 16 wire leads moulded into ends.	Control and power lead filter	78272 82066 Part #121392	240 0023 00 121392†††
L-115	R5950-237-1532-FCRC	COIL: r-f Choke; 400 μh; 4 pie 60 T/pie; universal wound of No. 30 AWG SSE copper wire; 3 mmf dist capacity; ⅜" dia x 1-1/16" overall; Aladdin #520 powdered iron core; .2" dia x ⅞" long with No. 16 wire leads moulded into ends.	Control and power lead filter	78272 82066 Part #121392	240 0023 00 121392†††
L-116	R5950-237-1532-FCRC	COIL: r-f Choke; 400 μh; 4 pie 60 T/pie; universal wound of No. 30 AWG SSE copper wire; 3 mmf dist capacity; ⅜" dia x 1-1/16" overall; Aladdin #520 powdered iron core; .2" dia x ⅞" long with No. 16 wire leads moulded into ends.	Control and power lead filter	78272 82066 Part #121392	240 0023 00 121392†††

L-117	R5950–237–1532–FCRC	COIL: r-f Choke; 400 μh; 4 pie 60 T/pie; universal wound of No. 30 AWG SSE copper wire; 3 mmf dist capacity; ⅜" dia x 1-1/16" overall; Aladdin #520 powdered iron core; .2" dia x ⅞" long with No. 16 wire leads moulded into ends.	Control and power lead filter	78272 82066 Part #121392	240 0023 00 121392†††
L-118	R5950–237–1532–FCRC	COIL: r-f Choke; 400 μh; 4 pie 60 T/pie; universal wound of No. 30 AWG SSE copper wire; 3 mmf dist capacity; ⅜" dia x 1-1/16" overall; Aladdin #520 powdered iron core; .2" dia x ⅞" long with No. 16 wire leads moulded into ends.	Control and power lead filter	78272 82066 Part #121392	240 0023 00 121392†††
L-119	R5950–237–1532–FCRC	COIL: r-f Choke; 400 μh; 4 pie 60 T/pie; universal wound of No. 30 AWG SSE copper wire; 3 mmf dist capacity; ⅜" dia x 1-1/16" overall; Aladdin #520 powdered iron core; .2" dia x ⅞" long with No. 16 wire leads moulded into ends.	Control and power lead filter	78272 82066 Part #121392	240 0023 00 121392†††
L-120	R5950–237–1532–FCRC	COIL: r-f Choke; 400 μh; 4 pie 60 T/pie; universal wound of No. 30 AWG SSE copper wire; 3 mmf dist capacity; ⅜" dia x 1-1/16" overall; Aladdin #520 powdered iron core; .2" dia x ⅞" long with No. 16 wire leads moulded into ends.	Control and power lead filter	78272 82066 Part #121392	240 0023 00 121392†††
L-121	R5950–237–1532–FCRC	COIL: r-f Choke; 400 μh; 4 pie 60 T/pie; universal wound of No. 30 AWG SSE copper wire; 3 mmf dist capacity; ⅜" dia x 1-1/16" overall; Aladdin #520 powdered iron core; .2" dia x ⅞" long with No. 16 wire leads moulded into ends.	Control and power lead filter	78272 82066 Part #121392	240 0023 00 121392†††
L-122	R5950–237–1532–FCRC	COIL: r-f Choke; 400 μh; 4 pie 60 T/pie; universal wound of No. 30 AWG SSE copper wire; 3 mmf dist capacity; ⅜" dia x 1-1/16" overall; Aladdin #520 powdered iron core; .2" dia x ⅞" long with No. 16 wire leads moulded into ends.	Control and power lead filter	78272 82066 Part #121392	240 0023 00 121392†††
L-123	R5950–237–1532–FCRC	COIL: r-f Choke; 400 μh; 4 pie 60 T/pie; universal wound of No. 30 AWG SSE copper wire; 3 mmf dist capacity; ⅜" dia x 1-1/16" overall; Aladdin #520 powdered iron core; .2" dia x ⅞" long with No. 16 wire leads moulded into ends.	Control and power lead filter	78272 82066 Part #121392	240 0023 00 121392†††
L-124	R5950–237–1532–FCRC	COIL: r-f Choke; 400 μh; 4 pie 60 T/pie; universal wound of No. 30 AWG SSE copper wire; 3 mmf dist capacity; ⅜" dia x 1-1/16" overall; Aladdin #520 powdered iron core; .2" dia x ⅞" long with No. 16 wire leads moulded into ends.	Control and power lead filter	78272 82066 Part #121392	240 0023 00 121392†††

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θ Contract N0a(s)-52-1027
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
° Contract N0a(s)-51-259
°° Contract N0a(s)-53-983

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: RADIO RECEIVERS R-105/ARR-15 and R-105A/ARR-15

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	MFR. and DESIG. or AWS TYPE	CONT. or GOVT. DWG. or SPEC. No.
L-125	R5950-237-1532-FCRC	COIL: r-f Choke; 400 µh; 4 pie 60 T/pie; universal wound of No. 30 AWG SSE copper wire; 3 mmf dist capacity; ⅜" dia x 1-1/16" overall; Aladdin #520 powdered iron core; .2" dia x ⅞" long with No. 16 wire leads moulded into ends.	Control and power lead filter	78272 82066 Part #121392	240 0023 00 121392†††
L-126	R5950-237-1532-FCRC	COIL: r-f Choke; 400 µh; 4 pie 60 T/pie; universal wound of No. 30 AWG SSE copper wire; 3 mmf dist capacity; ⅜" dia x 1-1/16" overall; Aladdin #520 powedered iron core; .2" dia x ⅞" long with No. 16 wire leads moulded into ends.	Control and power lead filter	78272 82066 Part #121392	240 0023 00 121392†††
L-127	R5800-C03-3808-FCRC	COIL: r-f Choke; 2 section 60T/section; No. 30 DSC copper wire; universal wound on 3/16" dia coil form; 17/32" dia x ⅝" long max overall.	Audio output r-f filter (Part of J-111)	13499	502 6942 002
L-127†††	R5800-C03-3808-FCRC	COIL: r-f Choke; 53µh; two section, 60T/section; No. 30 DSC copper wire; universal wound on 3/16" diam coil form; 17/32" dia x ⅝" long max overall.	Audio output r-f filter (Part of J-111)	82066 Part #122584	122584†††
L-128	R16-CR-240-0036-00	COIL: r-f Choke; 2.5 mh ±10%; 4 pie 220T/pie; duo-lateral wound of No. 36 SSE copper wire on a special ceramic form; ½" dia x 1-15/16" long overall; with end tapped for a 6-32 mtg screw.	High voltage r-f filter	42498 Part #R-1008	240 0036 00
L-129	R5950-433-7254-FCRC	COIL: i-f Primary Coil; assembly of coil and two terminal boards; 1⅛" x 1⅛" x 2½" max overall.	Z-119 i-f transformer primary	13499 82066 Part #122559	502 4861 003 122559†††
L-130*	R5950-433-7253-FCRC	COIL: Z-119 Secondary Assem; coil C-183; C-184 and terminal boards 1⅛" x 1⅛" x 2½" max overall.	Z-119 i-f transformer secondary	13499	502 4860 003
L-130† †† ††† φθ ** *** ° °°	R5950-433-7332-FCRC	COIL: Z-119 Secondary Coil Assembly; coil and two capacitors with terminal boards; 1⅛" x 2¾" max overall; Effective with serial #329.	Z-119 i-f transformer secondary	13499 82066 Part #122560	503 4863 003 122560†††
L-131	R5950-433-7254-FCRC	COIL: i-f Primary Coil assembly of coil and two terminal boards; 1⅛" x 1⅛" x 2½" max overall.	Z-120 i-f transformer primary	13499 82066 Part #122561	502 4861 002 122561†††
L-132*	R5950-433-7252-FCRC	COIL: Z-120 Secondary Coil Assembly; coil C-176; G-181 and terminal boards; 1⅛" x 1⅛" x 2½" max overall.	Z-120 i-f transformer secondary	13499	502 4859 003

L–132† ** †† *** ††† ° φθ °°	R5950–433–7331–FCRC	COIL: Z-120 Secondary Coil Assembly; coil and two capacitors with terminal boards; 1⅛" x 1-1/16" x 2¾" max overall; Effective with serial #329.	Z–120 i–f transformer secondary	13499 82066 Part #122562	503 4867 003 122562†††
L–133	R5950–433–7254–FCRC	COIL: i-f Primary Coil; assembly of coil and two terminal boards; 1⅛" x 1⅛" x 2½" max overall.	Z–121 i–f transformer primary	13499 82066 Part #122563	502 4861 003 122563†††
L–134*	R5950–369–6067–FCRC	COIL: Z-121 Secondary Coil Assembly; coil assem C-178; C-179 and term boards; 1⅛" x 1⅛" x 2½" max overall.	Z–121 i–f transformer secondary	13499	502 4858 003
L–134† ** †† *** ††† ° φθ °°	R5950–433–7330–FCRC	COIL: Z-121 Secondary Coil Assembly; coil and two capacitors with terminal boards; 1⅛" x 1⅛" x 2½" max overall; Effective with serial #329.	Z–121 i–f transformer secondary	13499 82066 Part #122564	503 4866 003 122564†††
O–101* †	R5841–433–7257–FCRC	AUTOTUNE MULTITURN HEAD: 96V-10 positioning mechanisms with locking bars; 3⅛" x 3⅛" x 4⅝" max overall.	Operates tuning control	13499	502 5389 005
O–101†† ** ††† *** φθ ° °°	R5820–432–3242–E121	AUTOTUNE MULTITURN HEAD: 96V-6; positioning mechanisms with locking bars; 3⅛" x 3⅛" x 4⅝" max overall; Effective with serial #1.	Operates tuning control	13499	503 7842 005
O–102* †		STOP RING SHAFT ASSEMBLY: consists of stop ring drum assembly; drive gear; clutch band assembly; two clutch springs; retaining ring; bearing; clutch spacer; collars with set screws.	Engages pawls and operates mechanism	13499	502 5368 002
O–102†† °° ††† ** *** ° φθ	R16–CR–503–7831–002	STOP RING SHAFT ASSEMBLY: consists of stop ring drum assembly drive gear; clutch band assembly; two clutch springs; retainer ring bearing; clutch spacer; collars pinned on; Effective with serial #1.	Engages pawls and operates mechanism	13499	503 7831 002
O–103	R16–CR–503–5302–002	RATCHET PAWL ASSEMBLY: consists of ratchet hub gear assembly; ratchet catch; ratchet pivot and ratchet spring.	Operates cam drum	13499	502 5302 002
O–104	R16–CR–503–1165–003	CAM DRUM ASSEMBLY: consists of cam drum; 39 degree cam, special pin and cam drum nut.	Selects correct pawl for desired channel	13499	503 1165 003
O–105* †		STOP RING PAWL SHAFT ASSEMBLY: consists of stop ring pawl assembly; pawl springs and spring anchor; collars with set screws.	Engages stop ring	13499	502 5310 002

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** Contract N0a(s)-51-103f
φ Contract N0a(s)-52-961
† Contract N0a(s)-9216
*** Contract N0a(s)-51-244a
θ Contract N0a(s)-52-1027
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
° Contract N0a(s)-51-259
°° Contract N0a(s)-53-983

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: RADIO RECEIVERS R-105/ARR-15 and R-105A/ARR-15

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	DESIG. or AWS TYPE MFR. and	CONT. or GOVT. DWG. or SPEC. No.
O-105†† ** ††† *** ° φθ °°	R16-CR-503-7800-002	STOP RING PAWL SHAFT ASSEMBLY: consists of stop ring pawl assembly; pawl springs and spring anchor; collars pinned on; Effective with serial #1.	Engages stop ring	13499	503 7800 002
O-106* †		COUNTER DRUM SHAFT ASSEMBLY: consists of counter drum pawl assembly; pawl springs and spring anchor; set screws.	Engages stop ring	13499	502 5309 002
O-106†† ** ††† *** ° φθ °°	R16-CR-503-7801-002	COUNTER DRUM SHAFT ASSEMBLY: consists of counter drum pawl assembly; pawl springs and spring anchor; pinned assembly; Effective with serial #1.	Engages stop ring	13499	503 7801 002
O-107* †		COUNTER DRUM ASSEMBLY: consists of planetary gear assembly; counter drum spacers; counter drum spring; counter drum drive gear and retaining ring; set screws.	Engages pawl	13499	502 5306 002
O-107†† °° ††† ** *** ° φθ	R16-CR-503-7808-002	COUNTER DRUM ASSEMBLY: consists of planetary gear assembly; counter drum spacers; counter drum spring; counter drum drive gear and retaining ring; pinned assembly; Effective with serial #1.	Engages pawl	13499	503 7808 002
O-108	R16-CR-502-5352-002	WORM SHAFT ASSEMBLY: consists of idler gear assembly; counter drum pinion; retaining ring washer; retaining ring and main worm shaft.	Operates AUTOTUNE MECHANISM	13499	502 5352 002
O-109* †		KNOB-SHAFT ASSEMBLY: consists of knob shaft; knob pinion and knob stop; set screws.	Manually operates AUTOTUNE head	13499	502 5354 002
O-109†† ** ††† *** φθ ° °°	R16-CR-503-7830-002	KNOB-SHAFT ASSEMBLY: consists of knob shaft; knob pinion and knob stop; pinned assembly; Effective with serial #1.	Manually operates AUTOTUNE head	13499	503 7830 002
O-110	R5821-036-7208-FCRC	UPPER RIGHT STANDOFF ASSEMBLY: consists of upper right standoff and one type 4 groove pin.	Positions front and rear plates	13499	502 5344 002
O-111	R5821-036-7209-FCRC	UPPER LEFT STANDOFF ASSEMBLY: consists of upper left standoff and one type 4 groove pin.	Positions front and rear plates	13499	502 5356 002

O-112* †	R5820–432–0325–E121	FRONT PLATE ASSEMBLY: consists of front plate gear assembly; front bearing race; front bearing lock nut; lock washer and inspection button.	Retains AUTOTUNE assemblies	13499	502 5314 003
O-112†† ** ††† *** φθ ° °°	R16-CR-503-7840-003	FRONT PLATE ASSEMBLY: consists of front plate gear assembly; front bearing race; front bearing lock nut; lock washer and inspection button; Effective with serial #1.	Retains AUTOTUNE assemblies	13499	503 7840 003
O-113* †		REAR PLATE ASSEMBLY: consists of rear plate gear assembly; rear bearing race; rear bearing lock nut and lock washer.	Retains AUTOTUNE assemblies	13499	502 5313 003
O-113†† ** ††† *** φθ ° °°	R16-CR-503-7838-003	REAR PLATE ASSEMBLY: consists of rear plate gear assembly; rear bearing race; rear bearing lock nut and lock washer; Effective with serial #1.	Retains AUTOTUNE assemblies	13499	503 7838 003
O-114	R5821–338–6933–FCRC	CAM DRIVE GEAR ASSEMBLY: consists of cam drum pinion and gear pin assembly.	Operates cam drum	13499	502 5347 002
O-115	R5975–031–0232–FCRC	LOCKING BAR ASSEMBLY: consists of locking screw and locking screw cap.	Locks stop ring stack	13499	502 1829 002
O-116* †	R16–CR–502–5348–002	STOP DRIVE ASSEMBLY: consists of stop gear assembly; push rod assembly; spring cap and rivet cap.	Positions home stop pawl operating gear	13499	502 5348 002
O-116†† ** ††† *** φθ ° °°		STOP DRIVE ASSEMBLY: consists of stop gear assembly; push rod assembly; spring cap and rivet cap; Effective with serial #1.	Positions home stop pawl operating gear	13499	503 7793 002
O-117* †		LOWER BEARING PLATE STANDOFF ASSEMBLY: consists of lower bearing plate stand-off; pawl lifter base; rivet; 4-40 hex nut; and 4-40 x 5/16" screw.	Retains pawl tails	13499	502 5346 002
O-117†† ** ††† *** φθ ° °°	R5821–562–3574–FCRC	LOWER BEARING PLATE STANDOFF ASSEMBLY: consists of lower bearing plate stand-off; pawl lifter base; pinned assembly; Effective with serial #1.	Retains pawl tails	13499	503 7792 002
0-118	R5821–338–6932–FCRC	WORM GEAR ASSEMBLY: consists of main drive gear and main drive bearing.	Operates AUTOTUNE mechanism	13499	502 5340 002
O-119* †	R5821–433–7223–FCRC	AUTOTUNE SINGLETURN HEAD: 96U-1 positioning mechanism; 1⅝" x 2⅞" x 4⅝" max overall.	Operates band switch	13499	502 1977 004

* Contract N5sa-8648 † Contract N0a(s)-9216 †† Contract N0a(s)-9972 ††† Contract N0a(s)-10901
** Contract N0a(s)-51-103f *** Contract N0a(s)-51-244a ° Contract N0a(s)-51-259
φ Contract N0a(s)-52-961 θ Contract N0a(s)-52-1027 °° Contract N0a(s)-53-983

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: RADIO RECEIVERS R-105/ARR-15 and R-105A/ARR-15

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	DESIG. or AWS TYPE MFR. and	CONT. or GOVT. DWG. or SPEC. No.
O-119†† ** ††† *** φθ ° °c	R5820-432-3243-E121	AUTOTUNE SINGLETURN HEAD: 96U-16 positioning mechanism; 1⅝" x 2⅞" x 4⅝" max overall; Effective with serial #1.	Operates band switch	13499	503 7702 004
O-120* †		STOP RING SHAFT ASSEMBLY: consists of stop ring drum assembly; clutch band assembly; clutch spring; clutch spacer; retaining ring; clutch fork spacer and clutch spring.	Engages pawl and operates mechanism	13499	502 1974 002
O-120†† ** ††† *** ° φθ °°		STOP RING SHAFT ASSEMBLY: consists of stop ring drum assembly; clutch band assembly; clutch spring; clutch spacer; retainer ring; clutch fork spacer and clutch spring; pinned assembly; Effective with serial #1.	Engages pawl and operates mechanism	13499	503 7701 002
O-121		RATCHET PAWL ASSEMBLY: consists of ratchet hub gear assembly; ratchet catch; ratchet pivot; and ratchet spring.	Operates cam drum	13499	502 1965 002
O-122	R16-CR-503-1165-003	CAM DRUM ASSEMBLY: consists of cam drum; 39 degree cam, special pin and cam drum nut.	Selects correct pawl for desired channel	13499	503 1165 003
O-123	R16-CR-502-1827-002	FRONT PLATE ASSEMBLY: consists of front bearing race; front bearing lock nut; stop bar; front bearing plate; bearing lock washer and inspection button.	Retains AUTOTUNE assemblies	13499	502 1827 002
O-124		REAR PLATE ASSEMBLY: consists of rear plate gear assembly; rear bearing race; gear bearing lock nut and bearing lock washer.	Retains AUTOTUNE assemblies	13499	502 1958 002
O-125		SPRING PAWL ASSEMBLY: consists of pawl shaft assembly; pawl springs; spring anchor and anchor pin.	Engages stop rings	13499	502 1959 002
O-126		UPPER STANDOFF ASSEMBLY: consists of upper bearing plate standoff casting and 4 groov-pins.	Positions front and rear plates	13499	502 1818 002
O-127		LOWER PLATE ASSEMBLY: consists of single plate tapped at both ends.	Positions front and rear plates	13499	502 1200 003
O-128	R5975-031-0232-FCRC	LOCKING BAR ASSEMBLY: consists of locking screw and locking screw cap.	Locks stop ring stack	13499	502 1829 002

O-129	R5840-433-7294-FCRC	SHAFT: AUTOTUNE Line; stainless steel type 303; .186" dia 7¼" long No. 10 Bristo socket ⅛" deep in one end.	Operates worm gears	13499 82066 Part #120677	502 6536 002 120677†††
O-130	R5820-090-4142-E121	GEAR: Control Unit Worm; SAE X-1315 steel; pitch dia .3333, diametrical pitch 48; pressure angle 20°; helix angle 3°33′ RH; shaft dia .187"; ⅜" dia x ⅞" long max overall.	Operates AUTOTUNE control unit	13499 82066 Part #120682	507 5513 00 120682†††
O-131	R5840-433-7292-FCRC	GEAR: Singleturn Worm; SAE X-1315 steel; pitch dia .4334; diametral pitch 32; pressure angle 20°; helix angle 4°8′ RH, shaft dia .187"; ½" dia x ⅞" long max overall.	Operates singleturn AUTOTUNE unit	13499 82066 Part #120679	502 6472 002 120679†††
O-132	R5840-433-7293-FCRC	GEAR: Multiturn Worm; SAE X-1315 Steel pitch dia .3816; diametral pitch 34; pressure angle 20°; helix angle 17°51′ RH; shaft dia .187"; 7/16" dia x ⅞" long max overall.	Operates multiturn AUTOTUNE unit	13499 82066 Part #120678	502 6499 002 120678†††
O-133	R3020-239-5694-E111	GEAR: line shaft; phosphor bronze; pitch dia 1⅝" diametral pitch 48, 78 teeth; pressure angle 20°, shaft dia .187"; 1-11/16" dia x ¼" thick max overall including hub.	Operates AUTOTUNE line shaft	13499 82066 Part #120680	502 6510 002 120680†††
O-134	R5821-431-5857-E111	COLLAR: Thrust; 18-8 stainless steel type 303; .187" ID; 250" OD x .250" long.	Prevents shaft end play	13499 82066 Part #120681	502 6533 002 120681†††
O-135	R5800-C03-3657-FCRC	BEARING: Thrust; ball bearing; stainless steel plates .432" dia x .18" thick max overall.	Prevents shaft end play	13499 82066 Part #122566	500 2122 002 122566†††
O-136	R5355-433-7249-FCRC	DIAL: Calibrate; consists of lfo dial pinion; calibrate index post; index assembly; calibrate switch; stop dog assembly and flexible coupler.	Calibration dial	13499 82066 Part #120643	502 4489 003 120643†††
O-137 †††	R5821-036-7205-FCRC R16-D-3123	DIAL: Assembly; consists of plate and hub assembly and drive washer.	Tuning dial	13499 82066 Part #120644	502 4480 003 120644†††
O-138*	R5840-433-7302-FCRC	SHAFT: Band Switch; flexible shafting with attached sleeves; 3/16" dia 15¼" long overall.	Operates band switch pinion gears	13499	502 6692 002
O-138† ** †† ** ††† ° φ θ °°	R5820-432-2856-E121	SHAFT: Band Switch; flexible shafting with attached sleeves; 3/16" dia x 15½" long overall: Effective with serial #329.	Operates band switch pinion gears	13499 82066 Part #120588	503 4849 002 120588†††
O-139	R5840-433-7303-FCRC	GEAR: Switch Drive; stainless steel type 303; 23 teeth; pitch dia .71"; diametral pitch 32; shaft dia .187"; 6-40 NF-2 set screw mtg.	Operates band switch shaft	13499 82066 Part #120526	502 6705 002 120526†††

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θ Contract N0a(s)-52-1027
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
° Contract N0a(s)-51-259
°° Contract N0a(s)-53-983

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: RADIO RECEIVERS R-105/ARR-15 and R-105A/ARR-15

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	MFR. and DESIG. or AWS TYPE	CONT. or GOVT. DWG. or SPEC. No.
O-140	R5840-433-7304-FCRC	GEAR: Band Switch Pinion brass; 22 teeth; pitch dia .687"; diametral pitch 32; shaft dia .25"; 6-40 NF-2 set screw mtg.	Operates band switch	13499 82066 Part #120527	502 6706 002 120527†††
O-141	R5840-433-7295-FCRC	SHAFT: Rack Drive; stainless steel type 303; integral pinion gear; .187" dia x 10.625" long.	Operates tuning slug rack gears	13499 82066 Part #120600	502 6580 003 120600†††
O-142	R5840-433-7296-FCRC	SHFAT: Rack Drive; stainless steel type 303; integral pinion gear; .187" dia x 5.343" long.	Operates tuning slug rack gears	13499 82066 Part #120594	502 6581 003 120594†††
O-143	R5820-090-3578-E111	GEAR: consists of drive loading gear No. 1; gear loading spring; and pin assembly; 1-7/16" dia x 7"16" thick; including hub, max overall.	Operates i-f platform assembly	13499 82066 Part #120588	502 6987 002 120588†††
O-144	R5820-090-3574-E111	GEAR: consists of loading gear No. 2; gear loading spring and pin assembly; 1-7/16" dia, 11/32" thick; including hub; max overall.	Operates i-f platform assembly	13499 82066 Part #120584	502 6985 002 120584†††
O-145	R5820-090-3578-E111	GEAR: consists of drive loading gear No. 1; gear loading spring; and pin assembly; 1-7/16" dia x 7/16" thick; including hub, max overall.	Operates r-f platform assembly	13499 82066 Part #120588	502 6987 002 120588†††
O-146	R16-G-2825	GEAR: consists of loading gear No. 2; gear loading spring and pin assembly; 1-7/16" dia x 11/32" thick including hub; max overall.	Operates r-f platform assembly	13499 82066 Part #120584	592 6985 002 120584†††
O-147* †	R5841-433-7256-FCRC	CONTROL UNIT: consists of electrical control circuit components; 2⅛" x 2-11/16" x 2-11/16" max overall.	AUTOTUNE system control	13499 Type 111B-1	502 5388 004
O-147†† ** ††† *** ° φθ °°	R5820-431-7844-E111	CONTROL UNIT: consists of electrical control circuit components; 2⅛" x 2-11/16" x 2-11/16" max overall. Effective with serial #1.	AUTOTUNE system control	13499 Type 111B-4	503 7895 004
O-148	R5330-599-1110-FCRC	GASKET: Corprene DC-11; .5" ID x .625" OD x 1/16" thick.	Antenna terminal gasket	13499 82066 Part #120637	502 6669 002 120637†††
O-149	R3010-287-8266-E111	COUPLER: flexible; 3/16" ID brass hub; Bakelite flange; 1-1/16" diam x 37/64"; two #6 Bristo set screws.	Calibration dial coupler	13499 82066 Part #122567	502 6473 002 122567†††
O-150†††	R16-S-8870-6000	SPRING, grounding; phosphor bronze, silver-plated; 3" x 2¾" x 5/32" o/a.	Ground for filter assem. cover	82066 Part #120622	120622†††

O-151†††	R16-S-8870-5000	SPRING, grounding; phosphor bronze, silver-plated; 3⅞" x 1⅜" x 1" o/a.	Ground for relay box	82066 Part #120608	120608†††
P-101†† *† †††	R5935-433-7325-FCRC	CONNECTOR: Male; 24 terminal plug; 1.62" x 4.22" x 2-15/16" max overall; moulded plastic type MTS-G-2 (JAN-P-63); aluminum alloy frame.	Receiver power connector	13499 82066 Part #121252	502 7006 002 121252†††
P-101 *** ** ° ϕθ °°	R5820-376-1688-FCRC	CONNECTOR: Plug, electrical; 24 rd male contacts; straight shape; 1.613 in. by 2.9375 in. by 4.220 in.	Rec power connector	71468 DP0-24-1	370 2049 00
P-102	R5935-433-7309-FCRC	CONNECTOR: Male; 22 terminal plug pins; 1¼" wide x 3¾" long x 3/32" thick; laminated phenolic type LTS-E-2 (JAN-P-13).	Line filter unit connector	13499 82066 Part #120624	502 6765 002 120624†††
P-103	R5935-433-7316-FCRC	CONNECTOR: Male; 23 terminal plug board, 1¼" x 2-3/32" x ¾" max overall; laminated phenolic type LTS-E-2 (JAN-P-13).	AUTOTUNE casting connector	82066	502 6906 002
P-103†††	R5935-433-7316-FCRC	CONNECTOR: Male; 23 terminal plug board; 1¼" x 2-3/32" x ¾" max overall; laminated phenolic type LTS-E-4 (JAN-P-13).	AUTOTUNE casting connector	82066 Part #120573	120573†††
P-104	R5935-433-7288-FCRC	CONNECTOR: Male; 16 terminal plug board; 1-9/16" wide x 1-13/16" long x ⅝" thick max overall; laminated phenolic type LTS-E-2 (JAN-P-13).	AUTOTUNE control unit connector	13499	502 6433 002
R-101	N16-R050632-0416	RESISTOR: Fixed; insulated composition; 100,000 ohm ±20%; ½ w .249" dia x .468"; No. 21 AWG axial wire leads; 1.625" long.	r-f amplifier AVC feed	RC20BF104M	MIL-R-11 745 1171 00
R-102	R16-JAN-RC20BF221K	RESISTOR: Fixed; insulated composition; 220 ohm ±10%; ½ w; .249" dia x .468"; No. 21 AWG axial wire leads; 1.625" long.	r-f amplifier cathode	RC20BF221K	MIL-R-11 745 1058 00
R-103	R16-R-17331-73	RESISTOR: Fixed; insulated composition; 47,000 ohms ±10%; ½ w; .249" dia x .468"; No. 21 AWG axial wire leads; 1.625" long.	r-f amplifier screen	RC20BF473K	MIL-R-11 745 1156 00
R-104	R16-R-17281-190	RESISTOR: Fixed; insulated composition; 4,700 ohm ±20%; ½ w; .249" dia x .468 long; No. 21 AWG axial wire leads; 1.625" long.	r-f amplifier plate	RC20BF472M	MIL-R-11 745 1115 00
R-105	R16-R-17354-14-190	RESISTOR: Fixed; insulated composition; 470,000 ohm ±10%; ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads; 1.625" long.	Mixer grid	RC20BF474K	MIL-R-11 745 1198 00
R-106	N16-R049768-0438	RESISTOR: Fixed; insulated composition; 470 ohm ±10%; ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads; 1.625" long.	Mixer cathode	RC20BF471K	MIL-R-11 745 1072 00

* Contract N5sa-8648
** Contract N0a(s)-51-103f
ϕ Contract N0a(s)-52-961
† Contract N0a(s)-9216
*** Contract N0a(s)-51-244a
θ Contract N0a(s)-52-1027
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
° Contract N0a(s)-51-259
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TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: RADIO RECEIVERS R-105/ARR-15 and R-105A/ARR-15

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	DESIG. or AWS TYPE MFR. and	CONT. or GOVT. DWG. or SPEC. No.
R-107	N16-R050371-0711	RESISTOR: Fixed; insulated composition; 22,000 ohm ±20%; 1 w; .28" dia x .75" long; No. 20 AWG axial wire leads 1.625" long.	Mixer and i-f HV bleeder	RC30BF223M	MIL-R-11 745 3143 00
R-108	N16-R050371-0711	RESISTOR: Fixed; insulated composition; 22,000 ohm ±20%; 1 w; .28" dia x .75" long; No. 20 AWG axial wire leads 1.625" long.	Mixer and i-f HV bleeder	RC30BF223M	MIL-R-11 745 3143 00
R-109	R16-R-17281-160	RESISTOR: Fixed; insulated composition; 4700 ohm ±20%; ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long.	Mixer plate	RC20BF742M	MIL-R-11 745 1115 00
R-110	N16-R050479-0435	RESISTOR: Fixed; insulated composition; 47,000 ohm ±20%; ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long.	First i-f amplifier avc	RC20BF473M	MIL-R-11 745 1157 00
R-111	R16-R-17262-55-35	RESISTOR: Fixed; insulated composition; 220 ohm ±5%; ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long.	First i-f amplifier cathode	RC20BF221J	MIL-R-11 745 1057 00
R-112	N16-R050632-0416	RESISTOR: Fixed; insulated composition; 100,000 ohm ±20%; ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long.	First i-f amplifier screen	RC20BF104M	MIL-R-11 745 1171 00
R-113	R16-R-17281-160	RESISTOR: Fixed; insulated composition; 4700 ohm ±20%; ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long.	First i-f amplifier plate	RC20BF472M	MIL-R-11 745 1115 00
R-114	N16-R050632-0416	RESISTOR: Fixed; insulated composition; 100,000 ohm ±20%; ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long.	Mixer injection grid	RC20BF104M	MIL-R-11 745 1171 00
R-115	R16-R-17262-55-35	RESISTOR: Fixed; insulated composition; 220 chm ±5%; ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long.	Second i-f amplifier cathode	RC29BF221J	MIL-R-11 745 1057 00
R-116	R16-R-17331-73	RESISTOR: Fixed; insulated composition; 47,000 ohm ±10%; ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long.	Second i-f amplifier screen	RC20BF473K	MIL-R-11 745 1156 00
R-117	R16-R-17281-160	RESISTOR: Fixed; insulated composition; 4700 ohm ±10%; ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long.	Second i-f amplifier plate	RC20BF472M	MIL-R-11 745 1115 00

R-118	R16-R-17331-73	RESISTOR: Fixed; insulated composition; 47,000 ohm ±10%; 153 wv ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long.	Detector load	RC20BF473K	MIL-R-11 745 1156 00
R-119* †	R16-R-17331-73	RESISTOR: Fixed; insulated composition; 47,000 ohm ±10%; 153 wv ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long.	Detector load	RC20BF473K	MIL-R-11 745 1156 00
R-119†† ** ††† *** φ ° θ °°	R16-R-17310-172	RESISTOR: Fixed; insulated composition; 22,000 ohm ±10%; ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long. Effective with serial #1.	Detector load	RC20BF223K	MIL-R-11 745 1142 00
R-120	R16-R-17309-65	RESISTOR: Fixed; insulated composition; 10,000 ohm ±10%; 71 wv ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long.	Detector load	RC20BF103K	MIL-R-11 745 1128 00
R-121* †	N16-R050974-0438	RESISTOR: Fixed; insulated composition; 1 megohm ±20%; 350 wv ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long.	avc load	RC20BF105M	MIL-R-11 745 1213 00
R-121†† ** ††† *** ° φθ °°	R16-JAN-RC20BF105K	RESISTOR: Fixed; insulated composition; 1 megohm ±10%; ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long; Effective with serial #1.	avc load	RC20BF105K	MIL-R-11 745 1212 00
R-122	R16-R-17309-65	RESISTOR: Fixed; insulated composition; 10,000 ohm ±10%; 71 wv ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long.	Delay voltage divider	RC20BF103K	MIL-R-11 745 1128 00
R-123	N16-R050821-0276	RESISTOR: Fixed; insulated composition; 47,000 ohm ±20%; 350 wv ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long.	avc accelerator tube plate load	RC20BF474M	MIL-R-11 745 1199 00
R-124* †	R16-R-17354-14-140	RESISTOR: Fixed; insulated composition; 470,000 ohm ±5%; 350 wv ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long.	Balance tube plate resistor	RC20BF474J	MIL-R-11 745 1197 00
R-124†† ** ††† *** ° φθ °°	R16-R-17354-14-190 sm.	RESISTOR: Fixed; insulated composition; 470,000 ohm ±10%; ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long; Effective with serial #1.	Balance tube plate resistor	RC20BF474K	MIL-R-11 745 1198 00

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** Contract N0a(s)-51-103f
φ Contract N0a(s)-52-961
† Contract N0a(s)-9216
*** Contract N0a(s)-51-244a
θ Contract N0a(s)-52-1027
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
° Contract N0a(s)-51-259
°° Contract N0a(s)-53-983

R-118	R16-R-17331-73	RESISTOR: Fixed; insulated composition; 47,000 ohm ±10%; 153 wv ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long.	Detector load	RC20BF473K	MIL-R-11 745 1156 00
R-119* †	R16-R-17331-73	RESISTOR: Fixed; insulated composition; 47,000 ohm ±10%; 153 wv ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long.	Detector load	RC20BF473K	MIL-R-11 745 1156 00
R-119†† ** ††† *** φ ° θ °°	R16-R-17310-172	RESISTOR: Fixed; insulated composition; 22,000 ohm ±10%; ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long. Effective with serial #1.	Detector load	RC20BF223K	MIL-R-11 745 1142 00
R-120	R16-R-17309-65	RESISTOR: Fixed; insulated composition; 10,000 ohm ±10%; 71 wv ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long.	Detector load	RC20BF103K	MIL-R-11 745 1128 00
R-121* †	N16-R050974-0438	RESISTOR: Fixed; insulated composition; 1 megohm ±20%; 350 wv ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long.	avc load	RC20BF105M	MIL-R-11 745 1213 00
R-121†† ** ††† *** ° φθ °°	R16-JAN-RC20BF105K	RESISTOR: Fixed; insulated composition; 1 megohm ±10%; ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long; Effective with serial #1.	avc load	RC20BF105K	MIL-R-11 745 1212 00
R-122	R16-R-17309-65	RESISTOR: Fixed; insulated composition; 10,000 ohm ±10%; 71 wv ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long.	Delay voltage divider	RC20BF103K	MIL-R-11 745 1128 00
R-123	N16-R050821-0276	RESISTOR: Fixed; insulated composition; 47,000 ohm ±20%; 350 wv ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long.	avc accelerator tube plate load	RC20BF474M	MIL-R-11 745 1199 00
R-124* †	R16-R-17354-14-140	RESISTOR: Fixed; insulated composition; 470,000 ohm ±5%; 350 wv ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long.	Balance tube plate resistor	RC20BF474J	MIL-R-11 745 1197 00
R-124†† ** ††† *** ° φθ °°	R16-R-17354-14-190 sm.	RESISTOR: Fixed; insulated composition; 470,000 ohm ±10%; ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long; Effective with serial #1.	Balance tube plate resistor	RC20BF474K	MIL-R-11 745 1198 00

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† Contract N0a(s)-9216
*** Contract N0a(s)-51-244a
θ Contract N0a(s)-52-1027
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
° Contract N0a(s)-51-259
°° Contract N0a(s)-53-983

R-130†† ** ††† *** φ ° θ °°	R16-R-17354-14-190 sm.	RESISTOR: Fixed; insulated composition; 470,000 ohm ±10%; ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long; Effective with serial #1.	Balance tube plate resistor	RC20BF474K	MIL-R-11 745 1193 00
R-131	R16-R-17279-1-9	RESISTOR: Fixed; insulated composition; 3300 ohm ±20%; ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long.	lfo decoupling	RC20BF332M	MIL-R-11 745 1108 00
R-132	R16-JAN-RC30BF104K	RESISTOR: Fixed; insulated composition; 100,000 ohm ±10%; 1 w; 316 wv; .280" dia x .750" long; No. 20 AWG axial wire leads 1.625" long.	AVC delay bias dropping	RC30BF104K	MIL-R-11 745 3170 00
R-133* †	R16-R-17309-65	RESISTOR: Fixed; insulated composition; 10,000 ohm ±10%; ½ w; .249" dia x .468" long No. 21 AWG axial wire leads 1.625" long.	Delay voltage divider	RC20BF103K	MIL-R-11 745 1128 00
R-133†† ** ††† *** φθ ° °°	N16-R049768-0438	RESISTOR: Fixed; insulated composition; 470 ohm ±10%; ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long; Effective with serial #1.	Delay voltage divider	RC20BF471K	MIL-R-11 745 1072 00
R-134* †	N16-R050371-0433	RESISTOR: Fixed; insulated composition; 22,000 ohm ±20%; 105 wv ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long.	Audio output equalization	RC20BF223M	MIL-R-11 745 1143 00
R-134†† ** ††† *** φθ ° °°	R16-R-17310-172	RESISTOR: Fixed; insulated composition; 22,000 ohm ±10%; ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long; Effective with serial #1.	Audio output equalization	RC20BF223K	MIL-R-11 745 1142 00
R-135	R16-JAN-RC20BF331K	RESISTOR: Fixed; insulated composition; 330 ohm ±10%; ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long.	Multiplier cathode	RC20BF331K	MIL-R-11 745 1065 00
R-136	N16-R050632-0416	RESISTOR: Fixed; insulated composition; 100,000 ohm ±20%; ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long.	Multiplier screen	RC20BF104M	MIL-R-11 745 1171 00
R-137	R16-R-17281-160	RESISTOR: Fixed; insulated composition; 4700 ohm ±20%; ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long.	Multiplier plate	RC20BF472M	MIL-R-11 745 1115 00
R-138	R16-R-17281-160	RESISTOR: Fixed; insulated composition; 4700 ohm ±20%; ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long.	hfo decoupling	RC20BF472M	MIL-R-11 745 1115 00

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θ Contract N0a(s)-52-1027
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
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°° Contract N0a(s)-53-983

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: RADIO RECEIVERS R-105/ARR-15 and R-105A/ARR-15

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	MFR. and DESIG. or AWS TYPE	CONT. or GOVT. DWG. or SPEC. No.
R-139* †	R5905-433-7203-FCRC	ATTENUATOR: Variable; composition 3 section; ½ w per section; ohmic tolerance ±20%; rotation 300° ±30°. % of total rotation / Sec A / Sec B / Sec C 0 / inf / 10 max / 10,000 25 / 30,000 / 2,500 / 7,500 50 / 7,000 / 7,000 / 5,000 75 / 2,500 / 30,000 / 2,500 100 / 10 max / inf / 10 max	"T" pad and cathode control	01121	380 0003 00
R-139†† †††	R5905-431-5720-E111	ATTENUATOR: Variable; Bridged "T" when used w/two 300 ohm resistors; composition; impedance of Section A clockwise log curve infinity to zero, impedance of Section B counterclockwise log curve zero to 300 ohms, Section C a carbon potentiometer 10,000 ohm ±10%; ½ w per section, 3 section; metal case 1⅞" long x 1-9/64" diam, shaft 1¼" long; threaded bushing ⅜" -32NS-2 x .250" long for mtg; Effective with serial #1.	"T" pad and cathode control	01121 82066 Part #121348	379 0088 00 121348†††
R-139 ** *** ° φ θ °°	R5905-212-7201-FCRC	ATTENUATOR: Variable; Bridged "T" when used w/two 300 ohm resistors; composition; impedance of Section A clockwise log curve infinity to zero, impedance of Section B counterclockwise log curve zero to 300 ohms, Section C a carbon potentiometer 7500 ohm ±10%; ½ w per section, 3 section; metal case 1⅞" long x 1-9/64" diam, shaft 1¼" long; RMA 10 counterclockwise log taper; attenuation decreases from 35 db to 0 db w/clockwise rotation, measured at 1000 cps; 7 solder lug terminals; threaded bushing ⅜"-32NS-2 x .250" long for mounting.	"T' pad and cathode control	01121	379 0242 00
R-140* †	R16-R-17263-16-4	RESISTOR: Insulated composition; 330 ohms ±20%; ½ w; .249" max dia; .468" long; No. 21 axial leads, 1.625" long.	"T" pad	RC20BF331M	MIL-R-11 745 1066 00
R-140†† ** ††† *** ° φ θ °°	R16-R-17262-71-500	RESISTOR: Fixed insulated composition; 300 ohm ±5%; ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long; Effective with serial #1.	"T" pad	RC20BF301J	MIL-R-11 745 1063 00

R-141* †	R16-R-17263-16-4	RESISTOR: Insulated composition; 330 ohms ±20%; ½ w; .249" max dia; .468" long; No. 21 axial leads, 1.625" long.	"T" pad	RC20BF331M	MIL-R-11 745 1066 00
R-141†† ** ††† *** φθ ° °°	R16-R-17262-71-500	RESISTOR: Fixed; insulated composition; 300 ohm ±5%; ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long; Effective with serial #1.	"T" pad	RC20BF301J	MIL-R-11 745 1063 00
R-142		Not Used.			
R-143	R16-R-17279-1-9	RESISTOR: Fixed; insulated composition; 3300 ohm ±20%; ½ w; .249" dia x .468"; No. 21 AWG axial wire leads 1.625" long.	Alignment isolating	RC20BF332M	MIL-R-11 745 1108 00
R-144	R16-P-5581-229	RESISTOR: Variable; composition; 500 ohm; linear taper; rotation 300 degrees ±20 degrees; 1-3/64" dia x 15/64" long max including shaft; slot in end shaft 1/16" deep x 1/16" wide.	Sensitivity control	71590 Series III 82066 Part #121408	380 0007 00 121408†††
R-145	R16-R-17309-65	RESISTOR: Fixed; insulated composition; 10,000 ohm ±10%; ½ w; .249" dia x .468"; No. 21 AWG axial wire leads 1.625" long.	Multiplier band, A & B equalizer	RC20BF103K	MIL-R-11 745 1128 00
R-146	R16-R-17256-54	RESISTOR: Fixed; insulated composition; 10 ohm ±10%; ½ w; .249" dia x .468"; No. 21 AWG axial wire leads 1.625" long.	Multiplier band, C & E equalizer	RC20BF100K	MIL-R-11 745 1002 00
R-147	R16-JAN-RC20BF150K	RESISTOR: Fixed; insulated composition; 15 ohm ±10%; ½ w; .249" dia x .468"; No. 21 AWG axial wire leads.	Multiplier band, D & F equalizer	RC20BF150K	MIL-R-11 745 1009 00
R-148		Not used.			
R-149		Not used.			
R-150* †	R5800-C02-8554-E222	RESISTOR: Fixed; insulated composition; 4700 ohm ±5%; ½ w; .249" dia x .468"; No. 21 AWG axial wire leads 1.625" long.	Balancer cathode	RC20BF472M	MIL-R-11 745 1113 00
R-150†† ** ††† *** φθ ° °°	N16-R050128-0438	RESISTOR: Fixed; insulated composition; 4700 ohm ±10%; ½ w; .249" dia x .468"; No. 21 AWG axial wire leads 1.625" long; Effective with serial #1.	Balancer cathode	RC20BF472K	MIL-R-11 745 1114 00
R-151* †	N16-R050821-0276	RESISTOR: Fixed; insulated composition; 470,000 ohm ±20%; ½ w; .249" dia x .468"; No. 21 AWG axial wire leads 1.625" long.	Audio driver grid	RC20BF474M	MIL-R-11 745 1199 00

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θ Contract N0a(s)-52-1027
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
° Contract N0a(s)-51-259
°° Contract N0a(s)-53-983

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: RADIO RECEIVERS R-105/ARR-15 and R-105A/ARR-15

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	DESIG. or AWS TYPE MFR. and	CONT. or GOVT. DWG. or SPEC. No.
R-151†† °° ** *** ° φθ	R16-R-17354-14-190 sm.	RESISTOR: Fixed; insulated composition; 470,000 ohm ±10%; ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long; Effective with serial #1.	Audio driver grid	RC20BF474K	MIL-R-11 745 1198 00
R-152* †	R16-R-17273-25	RESISTOR: Fixed; insulated composition; 2200 ohm ±5%; ½ w; .249" dia x .468"; No. 21 AWG axial wire leads 1.625" long.	Audio driver cathode	RC20BF222J	MIL-R-11 745 1099 00
R-152†† ** ††† *** φθ ° °°	R16-JAN-RC20BF152K	RESISTOR: Fixed; insulated composition; 1500 ohm ±10%; ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long; Effective with serial #1.	Audio driver cathode	RC20BF152K	MIL-R-11 745 1093 00
R-153* †	R5905-120-0394-E222	RESISTOR: Fixed; insulated composition; 330 ohm ±5%; 1 w; .28" dia x .75"; No. 20 AWG axial wire leads 1.625" long.	Audio cathode	RC30BF331J	MIL-R-11 745 3064 00
R-153†† ** ††† *** φθ ° °°	R16-JAN-RC30BF331K	RESISTOR: Fixed; insulated composition; 330 ohm ±10%; 1 w; .28" dia x .75"; No. 20 AWG axial wire leads 1.625" long; Effective with serial #1.	Audio cathode	RC30BF331K	MIL-R-11 745 3065 00
R-154* †	R5800-C02-8554-E222	RESISTOR: Fixed; insulated composition; 4700 ohm ±5%; ½ w; .249" dia x .468"; No. 21 AWG axial wire leads 1.625" long.	Balancer cathode	RC20BF472J	MIL-R-11 745 1113 00
R-154†† ** ††† *** φθ ° °°	N16-R050128-0438	RESISTOR: Fixed; insulated composition; 4700 ohm ±10%; ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long; Effective with serial #1.	Balancer cathode	RC20BF472K	MIL-R-11 745 1114 00
R-155* †	R16-R-17310-172	RESISTOR: Fixed; insulated composition; 22,000 ohm ±10%; ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long.	Crystal detector voltage dropping	RC20BF223K	MIL-R-11 745 1142 00
R-155†† ** ††† *** φθ ° °°	R16-JAN-RC20BF154K	RESISTOR: Fixed; insulated composition; 150,000 ohm ±20%; ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long; Effective with serial #1.	Detector load	RC20BF154K	MIL-R-11 745 1177 00
R-156* †		Not used.			

R-156†† ** ††† *** φθ ° °°	R16-P-5582-320	RESISTOR: Variable; composition; 2500 ohm ±20%; 1 w; metal case 1-5/32" dia x 19/32" deep; slotted metal shaft .250" dia x ⅝" long; semi-log taper; Effective with serial #1.	Audio level adjustment	01121 82066 Part #121350	380 0050 00 121350†††
R-157* †		Not used.			
R-157†† ** ††† *** φθ ° °°	R16-R-17256-54	RESISTOR: Fixed; insulated composition; 10 ohm ±10%; ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long; Effective with serial #85.	Grid resistor for V-101	RC20BF100K	MIL-R-11 745 1002 00
R-158†††	R16-R-17344-190	RESISTOR: Fixed; insulated composition; 100,000 ohm ±10%; ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long; Effective with serial #878.	L-134 loading	RC20BF104K	MIL-R-11 745 1170 00
S-101		SWITCH: consists of switch assemblies S-101A thru S-101E.			
S-101A	R5945-433-7315-FCRC	SWITCH: rack gear and movable contact assy; laminated phenolic rack; silver plated phosphor bronze contacts; ⅝" x 13/16" x 2¾" max overall.	ANTENNA coupling band switch	13499 82066 Part #120560	502 6904 002 120560†††
S-101B	R5945-433-7315-FCRC	SWITCH: rack gear and movable contact assy; laminated phenolic rack; silver plated phosphor bronze contacts; ⅝" x 13/16" x 2¾" max overall; part of S-101A.	r-f amplifier grid band switch	13499 82066 Part #120560	502 6904 002 120560†††
S-101C	R5930-433-7305-FCRC	SWITCH: rack gear and movable contact assy; laminated phenolic rack; silver plated phosphor bronze contact 5/16" x ⅝" x 2-11/16" long.	r-f amplifier plate, band switch	13499 82066 Part #120561	502 6708 002 120561†††
S-101D	R5930-433-7305-FCRC	SWITCH: rack gear and movable contact assy; laminated phenolic rack; silver plated phosphor bronze contact 5/16" x ⅝" x 2-11/16" long.	Mixer grid, band switch	13499 82066 Part #120561	502 6708 002 120561†††
S-101E	R5930-433-7305-FCRC	SWITCH: rack gear and movable contact assy; laminated phenolic rack; silver plated phosphor bronze contact 5/16" x ⅝" x 2-11/16" long.	Multiplier, band switch	13499 82066 Part #120561	502 6708 002 120561†††
S-102	R5930-232-6168-FCRC	SWITCH: 4 circuit; 2 position, rotor; contacts ⅛" dia; silver; 2 amp at 28 volts dc; two mounting holes tapped 4-40 NC-2.	cw, mcw-cal switch	13499 82066 Part #121489	502 4686 003 121489†††

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φ Contract N0a(s)-52-961 θ Contract N0a(s)-52-1027 °° Contract N0a(s)-53-983

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: RADIO RECEIVERS R-105/ARR-15 and R-105A/ARR-15

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	DESIG. or AWS TYPE MFR. and	CONT. or GOVT. DWG. or SPEC. No.
S-103 †††	R5930–244–5001–D334	SWITCH: one normally open; one normally closed circuit; operating pressure to trip max 20 oz to allow reset min 5 oz ½″ x 21/32″ x 1¾″ two .095″ holes.	Calibrate switch	99142 Cat. CR1070-C103C3 Special	260 0012 00
S-104 †††	R5930–432–2645–E222 R16–BNL–121469	SWITCH: control; manual operate; remote or manual release; 26.5 v Solenoid, 1⅞″ dia x 2⅜″ long max overall.	Power Control	73949	269 1017 00
S-105	R5800–C02–9753–E121	SWITCH: 1 circuit; 10 position; non-shorting rotary; 1½″ x 1-15/16″ x 1⅞″ max overall; sleeve mtg. tapped ⅜-32 NS-2.	Channel Selector	76854	259 0012 00
S-106	R5930–432–2649–E121	SWITCH: 1 circuit 10 position; shorting type; ⅝″ x 1⅜″ x 1.56″ max overall.	Channel seeking (coarse)	13499	502 1894 003
S-107* †	R5930–090–3229–E111	CONTACT ASSEMBLY, SWITCH: 1 circuit normally closed; cam operated; 1″ x 1-1/16″ x .43″ max overall.	Channel seeking (fine)	13499	502 6428 002
S-107†† ††† ** *** ° φθ °°	R5820–431–7818–E111	CONTACT ASSEMBLY, SWITCH: channel seeking breaker arm; consists of upper contact arm, lower contact arm, spacers, indicator arm and eyelets; 2 contact arms parallel, contacts NC; 1″ x 1-1/16″ x .43″ max overall; Effective with serial #1.	Channel seeking (fine)	13499	503 3402 002
S-108	R5930–433–7287–FCRC	CONTACT ASSEMBLY, SWITCH: clutch limit switch; consists of 2 cont arm assem, clutch stop, spacers and eyelets; 1 circuit NC; 1″ x 1-1/16″ x 1⅛″ max overall.	AUTOTUNE over run limit switch	13499	502 6413 002
S-109		SWITCH: consists of switch assemblies S-109A and S-109B; 3 circuit, 2 position.			
S-109A	R5930–433–7289–FCRC	CONTACT ASSEMBLY, SWITCH: movable contacts; consists of 3 contact arms riveted to shaft pin assembly; 1¾″ long x 1⅝″ wd x ⅝″ thk o/a.	Motor reversing switch movable contacts	13499	502 6435 002
S-109B	R5945–433–7291–FCRC	CONTACT ASSEMBLY, SWITCH: stationary contacts; strip w/3 contacts and strip w/2 contacts mtd opposite by means of 2 contact connectors, 1-7/16″ lg x 13/16″ wd x 1-1/16″ h o/a.	Motor reversing switch stationary contacts	13499	502 6438 002

S-110* † †††	R17-S-28255-3	SWITCH, TOGGLE: SPST; 3A, 125 v; 17/32" x 1⅛" x 1-13/16" max overall.	Pilot lamp circuit control	13499 (JAN alternate ST16A) or 6000 Part #121405	266 3006 00 121405†††
S-110†† °° ** *** ° φθ	R5930-108-7142-D334	SWITCH, TOGGLE: SPST; 6 amp 125 v; 1⅛" lg x ½" wd x ½" h body; mtg bushing 15/32"—32 NS-2 x ⅜" lg; Effective with serial #1.	Pilot lamp circuit control	13499 (JAN alternate ST16A)	266 0011 00
T-101	R5950-151-4855-FCRC	TRANSFORMER: audio output; pri 7000 ohms impedance; sec 300 ohms impedance; 1-13/32" x 1-21/32" x 2⅜" high with mounting flange; 1 watt max freq response 300 to 4000 cps ±2 db; 4 solder lug terminals on bottom; two .187" dia mtg holes on 2" centers hermetically sealed.	Audio output transformer	97965 82066 Part #121256	677 0037 00 121256†††
V-101	N16-T-58325	ELECTRON Tube: pentode, amplifier; 12SG7Y	r-f amplifier	12SG7Y	MIL-E-1C 254 0895 00
V-102	N16-T-58325	ELECTRON Tube: pentode, amplifier; 12SG7Y	Mixer	12SG7Y	MIL-E-1C 254 0895 00
V-103	N16-T-58325	ELECTRON Tube: pentode, amplifier; 12SG7Y	1st i-f amplifier	12SG7Y	MIL-E-1C 254 0895 00
V-104	N16-T-58325	ELECTRON Tube: pentode, amplifier; 12SG7Y	2nd i-f amplifier	12SG7Y	MIL-E-1C 254 0895 00
V-105	N16-T-58339	ELECTRON Tube: double triode, amplifier; 12SL7	Balancer tube	12SL7	MIL-E-1C 254 0258 00
V-106	N16-T-58339	ELECTRON Tube: double triode, amplifier; 12SL7	avc tube	12SL7	MIL-E-1C 254 0258 00
V-107*	N16-T-58331	ELECTRON Tube: pentode, amplifier; 12SJ7	Audio driver	12SJ7	MIL-E-1C 254 0254 00
V-107†† ** ††† *** φθ ° °°	N16-T-58339	ELECTRON Tube: double triode, amplifier; 12SL7	Balancer/Audio driver	12SL7	MIL-E-1C 254 0258 00
V-108	N16-T-58228	ELECTRON Tube: beam power amplifier; 12A6Y	Audio output	12A6Y	MIL-E-1C 254 0894 00
V-109	N16-T-58325	ELECTRON Tube: pentode, amplifier; 12SG7Y	hf osc multiplier	12SG7Y	MIL-E-1C 254 0895 00
V-110	N16-T-58260	ELECTRON Tube: duo-triode; 12H6	Noise limiter	12H6	MIL-E-1C 254 0240 00

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TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: RADIO RECEIVERS R-105/ARR-15 and R-105A/ARR-15

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	DESIG. or AWS TYPE MFR. and	CONT. or GOVT. DWG. or SPEC. No.
V-111* †	R17-L-6802-100	TUBE: NEON; Part of autotune control unit O-147; for use on voltages above 90 v dc and 65 v a-c with series resistance; 1/25 w, 9/32" diam; 1-1/16" long.	Surge absorber	99142 Cat. NE-2	262 0025 00
V-111†† ** ††† *** ° φθ °°		NOT USED: Effective with serial #1.			
X-101	N16-S-63511-1961	SOCKET: Tube; std octal; ceramic; 1-13/16" dia x 13/16" max with cad plated mtg ring; 1-5/16" mtg centers.	Socket for V-101	76649	220 1012 00
X-102	N16-S-63511-1961	SOCKET: Tube; std octal; ceramic; 1-13/16" dia x 13/16" max with cad plated mtg ring; 1-5/16" mtg centers.	Socket for V-102	76649	220 1012 00
X-103	N16-S-63511-1961	SOCKET: Tube; std octal; ceramic; 1-13/16" dia x 13/16" max with cad plated mtg ring; 1-5/16" mtg centers.	Socket for V-103	76649	220 1012 00
X-104	N16-S-63511-1961	SOCKET: Tube; std octal; ceramic; 1-13/16" dia x 13/16" max with cad plated mtg ring; 1-5/16" mtg centers.	Socket for V-104	76649	220 1012 00
X-105	N16-S-63511-1961	SOCKET: Tube; std octal; ceramic; 1-13/16" dia x 13/16" max with cad plated mtg ring; 1-5/16" mtg centers.	Socket for V-105	76649	220 1012 00
X-106	N16-S-63511-1961	SOCKET: Tube; std octal; ceramic; 1-13/16" dia x 13/16" max with cad plated mtg ring; 1-5/16" mtg centers.	Socket for V-106	76649	220 1012 00
X-107	N16-S-63511-1961	SOCKET: Tube; std octal; ceramic; 1-13/16" dia x 13/16" max with cad plated mtg ring; 1-5/16" mtg centers.	Socket for V-107	76649	220 1012 00
X-108	N16-S-63511-1961	SOCKET: Tube; std octal; ceramic; 1-13/16" dia x 13/16" max with cad plated mtg ring; 1-5/16" mtg centers.	Socket for V-108	76649	220 1012 00
X-109	N16-S-63511-1961	SOCKET: Tube; std octal; ceramic; 1-13/16" dia x 13/16" max with cad plated mtg ring; 1-5/16" mtg centers.	Socket for V-109	76649	220 1012 00

X-110	N16-S-63511-1961	SOCKET: Tube; std octal; ceramic; 1-13/16" dia x 13/16" max with cad plated mtg ring; 1-5/16" mtg centers.	Socket for V-110	76649	220 1012 00
Z-101* *** † °° †† ° **	R5950-237-1541-FCRC	COIL: r-f; 12.5-18.5 mc; 15 turns of No. 28 DE copper wire; asymmetrically space wound on a special ceramic form ⅜"-⅞" dia x 2-9/16" max overall with 50-75 mmf capacitor.	Band F, 12.5 mc-18.5 mc, r-f tuning	13499	502 6961 003
Z101†††	R5950-237-1541-FCRC	COIL: r-f; 12.5-18.5 mc; 15 turns of No. 28 DE copper wire; asymmetrically space wound on a special ceramic form; body 0.343" dia x 1-3/16" lg; 2½" lg x 1" wd x ⅝" thk o/a with 50-75 mmf capacitor.	Band F, 12.5 mc-18.5 mc, r-f tuning	82066 Part #121341	121341†††
Z-102* † ††	R5950-237-1542-FCRC	COIL: r-f; 8.5-12.5 mc; 21 turns of No. 28 DE copper wire; asymmetrically space wound on a special ceramic form ⅜"-⅞" dia x 2-9/16" long max overall with 75-100 mmf capacitor.	Band E, 8.5 mc-12.5 mc, r-f tuning	13499	502 6960 003
Z-102†††	R16-F-1950-611	COIL: r-f; 8.5-12.5 mc; 21 turns of No. 28 DE copper wire; asymmetrically space wound on a special ceramic form; body 0.375" dia x 1-3/16" lg; 2½" lg x 1" wd x ⅝" thk o/a with 75-100 mmf capacitor.	Band E, 8.5 mc-12.5 mc, r-f tuning	82066 Part #121342	121342†††
Z-102φθ ** *** ° °°	R5950-645-7142-FCRC	COIL: r-f; 8.5-12.5 mc; 21 turns of No. 28 DE copper wire; asymmetrically space wound on a special ceramic form; body 0.373" dia x ⅝" long; 0.356" dia x 1.187" long with 83-105 mmf capacitor.	Band E, 8.5 mc-12.5 mc, r-f tuning	13499	540 1921 003
Z-103* † ††	R5950-237-1540-FCRC	COIL: r-f; 5.5-8.5 mc; 25 turns of No. 28 DE copper wire; asymmetrically space wound on a special ceramic form ⅜"-⅞" dia x 2-9/16" max overall with 125-150 mmf capacitor.	Band D, 5.5 mc-8.5 mc, r-f tuning	13499	502 6962 003
Z-103†††	R16-F-1950-612	COIL: r-f; 5.5-8.5 mc; 25 turns of No. 28 DE copper wire; asymmetrically space wound on a special ceramic form; body 0.343" dia x 1-3/16" lg; 2½" lg x 1" wd x ⅝" thk o/a with 125-150 mmf capacitor.	Band D, 5.5 mc-8.5 mc, r-f tuning	82066 Part #121343	121343†††

* Contract N5sa-8648
** Contract N0a(s)-51-103f
φ Contract N0a(s)-52-961
† Contract N0a(s)-9216
*** Contract N0a(s)-51-244a
θ Contract N0a(s)-52-1027
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
° Contract N0a(s)-51-259
°° Contract N0a(s)-53-983

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: RADIO RECEIVERS R-105/ARR-15 and R-105A/ARR-15

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	MFR. and DESIG. or AWS TYPE	CONT. or GOVT. DWG. or SPEC. No.
Z-103φθ ** *** ° °°	R5950-645-7526-FCRC	COIL: r-f; 5.5-8.5 mc; 25 turns of No. 28 DE copper wire; asymmetrically space wound on a special ceramic form; body 0.373" dia x ⅝" long; 0.349" dia x 1.187" long with 127-148 mmf capacitor.	Band D	13499	540 1922 003
Z-104* † ††	R5950-237-1539-FCRC	COIL: r-f; 3.5-5.5 mc; 32 turns of No. 28 DE copper wire; asymmetrically space wound on a special ceramic form ⅜"-⅞" dia x 2-9/16" long max overall with 200-225 mmf capacitor.	Band C, 3.5 mc-5.5 mc, r-f tuning	13499	502 6963 003
Z-104†††	R16-F-1950-607	COIL: r-f; 3.5-5.5 mc; 32 turns of No. 28 DE copper wire; asymmetrically space wound on a special ceramic form; body 0.343" dia x 1-3/16" lg; 2½" lg x 1" wd x ⅝" thk o/a with 200-225 mmf capacitor.	Band C, 3.5 mc-5.5 mc, r-f tuning	82066 Part #121344	121344†††
Z-104φθ ** *** ° °°	R5950-645-7528-FCRC	COIL: r-f; 3.5-5.5 mc; 31 turns of No. 28 DE copper wire; asymmetrically space wound on a special ceramic form; body 0.373" dia x ⅝" lg; 0.344" dia x 1.187" lg with 210-230 mmf condenser.	Band C, 3.5 mc-5.5 mc, r-f tuning	13499	540 1923 003
Z-105	R5950-351-2852-FCRC	COIL: r-f; 2.5-3.5 mc; 41 turns of No. 28 DE copper wire; asymmetrically space wound on a special ceramic form ⅜"-⅞" dia x 2-9/16" long max overall with 300-325 mmf capacitor.	Band B, 2.5 mc-3.5 mc, r-f tuning	13499	502 6964 003
Z-105†††	R16-F-1950-608	COIL: r-f; 2.5-3.5 mc; 41 turns of No. 28 DE copper wire; asymmetrically space wound on a special ceramic form; body 0.375" dia x 1-3/16" lg; 2½" lg x 1" wd x ⅝" thk o/a with 300-325 mmf capacitor.	Band B, 2.5 mc-3.5 mc, r-f tuning	82066 Part #121345	121345†††
Z-106	R5950-237-1543-FCRC	COIL: r-f; 1.5-2.5 mc; 52 turns of No. 30 DE copper wire; asymmetrically space wound on a special ceramic form ⅜"-⅞" dia x 2-9/16" long max overall with 500-540 mmf capacitor.	Band A, 1.5 mc-2.5 mc, r-f tuning	13499	502 6965 003
Z-106†††	R16-F-1950-609	COIL: r-f; 1.5-2.5 mc; 52 turns of No. 30 DE copper wire; asymmetrically space wound on a special ceramic form; body 0.330" dia x 1-3/16" lg; 2½" lg x 1" wd x ⅝" thk max o/a with 500-540 mmf capacitor.	Band A, 1.5 mc-2.5 mc, r-f tuning	82066 Part #121346	121346†††

Z-107	R5950-237-1541-FCRC	COIL: r-f; 12.5-18.5 mc; 15 turns of No. 28 DE copper wire; asymmetrically space wound on a special ceramic form 3/8"-7/8" dia x 2-9/16" long max overall with 50-75 mmf capacitor.	Band F, 12.5 mc-18.5 mc, band pass tuning	13499	502 6961 003
Z-107†††	R5950-237-1541-FCRC	COIL: r-f; 12 5-18.5 mc; 15 turns of No. 28 DE copper. wire; asymmetrically space wound on a special ceramic form; body 0.343" dia x 1-3/16" lg; 2½" lg x 1" wd x 5/8" thk o/a with 50-75 mmf capacitor.	Band F, 12.5 mc-18.5 mc, r-f tuning	82066 Part #121341	121341†††
Z-108	R5950-237-1541-FCRC	COIL: r-f; 12.5-18.5 mc; 15 turns of No. 28 DE copper wire; asymmetrically space wound on a special ceramic form 3/8"-7/8" dis x 2-9/16" long max overall with 75-100 mmf capacitor.	Band F, 12.5 mc-18.5 mc, band pass tuning	13499	502 6961 003
Z-108†††	R5950-237-1541-FCRC	COIL: r-f; 12.5-18.5 mc; 15 turns of No. 28 DE copper wire; asymmetrically space wound on a special ceramic form; body 0.343" dia x 1-3/16" lg; 2½" lg x 1" wd x 5/8" thk o/a with 50-75 mmf capacitor.	Band F, 12.5 mc-18.5 mc, band pass tuning	82066 Part #121341	121341†††
Z-109	R5950-237-1541-FCRC	COIL: r-f; 12.5-18.5 mc; 15 turns of No. 28 DE copper wire; asymmetrically space wound on a special ceramic form 3/8"-7/8" dia x 2-9/16" long max overall with 50-75 mmf capacitor.	Band F, 12.5 mc-18.5 mc, band pass tuning	13499	502 6961 003
Z-109†††	R5950-237-1541-FCRC	COIL: r-f; 12.5-18.5 mc; 15 turns of No. 28 DE copper wire; asymmetrically space wound on a special ceramic form; body 0.343" dia x 1-3/16" lg; 2½" lg x 1" wd x 5/8" thk o/a with 50-75 mmf capacitor.	Band F, 12.5 mc-18.5 mc, band pass tuning	82066 Part #121341	121341†††
Z-110	R5950-237-1542-FCRC	COIL: r-f; 8.5-12.5 mc; 21 turns of No. 28 DE copper wire; asymmetrically space wound on a special ceramic form 3/8"-7/8" dia x 2-9/16" long max overall with 75-100 mmf capacitor.	Band E, 8.5 mc-12.5 mc, band pass tuning	13499	502 6960 003
Z-110†††	R16-F-1950-611	COIL: r-f; 8.5-12.5 mc; 21 turns of No. 28 DE copper wire; asymmetrically space wound on a special ceramic form; body 0.375" dia x 1-3/16" lg; 2½" lg x 1" wd x 5/8" thk o/a with 75-100 mmf capacitor.	Band E, 8.5 mc-12.5 mc, band pass tuning	82066 Part #121342	121342

* Contract N5sa-8648
** Contract N0a(s)-51-103f
ϕ Contract N0a(s)-52-961
† Contract N0a(s)-9216
*** Contract N0a(s)-51-244a
θ Contract N0a(s)-52-1027
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
° Contract N0a(s)-51-259
°° Contract N0a(s)-53-983

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: RADIO RECEIVERS R-105/ARR-15 and R-105A/ARR-15

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	MFR. and DESIG. or AWS TYPE	CONT. or GOVT. DWG. or SPEC. No.
Z-111	R5950-237-1542-FCRC	COIL: r-f; 8.5-12.5 mc; 21 turns of No. 28 DE copper wire; asymmetrically space wound on a special ceramic form 3/8"-7/8" dia x 2-9/16" long max overall with 75-100 mmf capacitor.	Band E, 8.5 mc-12.5 mc, band pass tuning	13499	502 6960 003
Z-111†††	R16-F-1950-611	COIL: r-f; 8.5-12.5 mc; 21 turns of No. 28 DE copper wire; asymmetrically space wound on a special ceramic form; body 0.375" dia x 1-3/16" lg; 2½" lg x 1" wd x 5/8" thk o/a with 75-100 mmf capacitor.	Band E, 8.5 mc-12.5 mc, band pass tuning	82066 Part #121342	121342
Z-112* † ††	R5950-237-1542-FCRC	COIL: r-f; 8.5-12.5 mc; 21 turns of No. 28 DE copper wire; asymmetrically space wound on a special ceramic form 3/8"-7/8" dia x 2-9/16" long max overall with 75-100 mmf capacitor.	Band E, 8.5 mc-12.5 mc, band pass tuning	13499	502 6960 003
Z-112†††	R16-F-1950-611	COIL: r-f; 8.5-12.5 mc; 21 turns of No. 28 DE copper wire; asymmetrically space wound on a special ceramic form; body 0.375" dia x 1-3/16" lg; 2½" lg x 1" wd x 5/8" thk o/a with 75-100 mmf capacitor.	Band E, 8.5 mc-12.5 mc, band pass tuning	82066 Part #121342	121342
Z-112φθ ** *** ° °°	R16-CR-540-1924-003	COIL: r-f; 8.5-12.5 mc; 21 turns of No. 28 DE copper wire; asymmetrically space wound on a special ceramic form; body 0.373" dia x 5/8" lg; 0.356" dia x 1.187" lg with 83-105 mmf capacitor.	Band E, 8.5 mc-12.5 mc, band pass tuning,	13499	540 1924 003
Z-113	R5950-237-1540-FCRC	COIL: r-f; 5.5-8.5 mc; 25 turns of No. 28 DE copper wire; asymmetrically space wound on a special ceramic form 3/8"-7/8" dia x 2-9/16" long max overall with 125-150 mmf capacitor.	Band D, 5.5 mc-8.5 mc, band pass tuning	13499	502 6962 003
Z-113†††	R16-F-1950-612	COIL: r-f; 5.5-8.5 mc; 25 turns of No. 28 DE copper wire; asymmetrically space wound on a special ceramic form; body 0.343" dia x 1-3/16" lg; 2½" lg x 1" wd x 5/8" thk o/a with 125-150 mmf capacitor.	Band D, 5.5 mc-8.5 mc, band pass tuning	82066 Part #121343	121343†††
Z-114	R5950-237-1540-FCRC	COIL: r-f; 5.5-8.5 mc; 25 turns of No. 28 DE copper wire; asymmetrically space wound on a special ceramic form 3/8"-7/8" dia x 2-9/16" long max overall with 125-150 mmf capacitor.	Band D, 5.5 mc-8.5 mc, band pass tuning	13499	502 6962 003

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: RADIO RECEIVERS R-105/ARR-15 and R-105A/ARR-15

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	MFR. and DESIG. or AWS TYPE	CONT. or GOVT. DWG. or SPEC. No.
Z-114†††	R16-F-1950-612	COIL: r-f; 5.5-8.5 mc; 25 turns of No. 28 DE copper wire; asymmetrically space wound on a special ceramic form; body 0.343" dia x 1-3/16" lg; 2½" lg x 1" wd x ⅝" thk o/a with 125-150 mmf capacitor.	Band D, 5.5 mc-8.5 mc, band pass tuning	82066 Part #121343	121343†††
Z-115	R5905-237-1539-FCRC	COIL: r-f; 3.5-5.5 mc; 32 turns of No. 28 DE copper wire; asymmetrically space wound on a special ceramic form ⅜"-⅞" dia x 2-9/16" long max overall with 200-225 mmf capacitor.	Band C, 3.5 mc-8.5 mc, band pass tuning	13499	502 6963 003
Z-115†††	R16-F-1950-607	COIL: r-f; 3.5-5.5 mc; 32 turns of No. 28 DE copper wire; asymmetrically space wound on a special ceramic form; body 0.343" dia x 1-3/16" lg; 2½" lg x 1" wd x ⅝" thk o/a with 200-225 mmf capacitor.	Band C, 3.5 mc-8.5 mc, band pass tuning	82066 Part #121344	121344†††
Z-116	R5950-237-1539-FCRC	COIL: r-f; 3.5-5.5 mc; 32 turns of No. 28 DE copper wire; asymmetrically space wound on a special ceramic form ⅜"-⅞" dia x 2-9/16" long max overall with 200-225 mmf capacitor.	Band C, 3.5 mc-8.5 mc, band pass tuning	13499	502 6963 003
Z-116†††	R16-F-1950-607	COIL: r-f; 3.5-5.5 mc; 32 turns of No. 28 DE copper wire; asymmetrically space wound on a special ceramic form; body 0.343" dia x 1-3/16" lg; 2½" lg x 1" wd x ⅝" thk o/a with 200-225 mmf capacitor.	Band C, 3.5 mc-8.5 mc, band pass tuning	82066 Part #121344	123344†††
Z-117	R5950-351-2852-FCRC	COIL: r-f; 2.5-3.5 mc; 41 turns of No. 28 DE copper wire; asymmetrically space wound on a special ceramic form ⅜"-⅞" dia x 2-9/16" long max overall with 300-325 mmf capacitor.	Band B, 2.5 mc-3.5 mc, band pass tuning	13499	502 6964 003

Z-117†††	R16-F-1950-608	COIL: r-f; 2.5-3.5 mc; 41 turns of No. 28 DE copper wire; asymmetrically space wound on a special ceramic form; body 0.375" dia x 1-3/16" lg; 2½" lg x 1" wd x ⅝" thk o/a with 300-325 mmf capacitor.	Band B, 2.5 mc-3.5 mc, band pass tuning	82066 Part #121345	121345†††
Z-118	R5950-237-1543-FCRC	COIL: r-f; 1.5-2.5 mc; 52 turns of No. 30 DE copper wire; asymmetrically space wound on a special ceramic form ⅜"—⅞" dia x 2-9/16" long max overall with 500-540 mmf capacitor.	Band A, 1.5 mc-2.5 mc, band pass tuning	13499	502 6965 003
Z-118†††	R16-F-1950-609	COIL: r-f; 1.5-2.5 mc; 52 turns of No. 30 DE copper wire; asymmetrically space wound on a special ceramic form; body 0.330" dia x 1-3/16" lg; 2½" lg x 1" wd x ⅝" thk o/a with 500-540 mmf capacitor.	Band A, 1.5 mc-2.5 mc, band pass tuning	82066 Part #121346	121346†††
Z-119*	R5950-318-4024-FCRC	TRANSFORMER: i-f; 450-550 kc; first i-f; shielded; 1-13/64" x 2-37/64" x 3-7/16" high.	First i-f transformer	13499	502 7034 004
Z-119† ** †† *** ††† φθ ° °°	R5950-153-4975-E121	TRANSFORMER: i-f; 450-550 kc; consists of L-129, L-130, C-112, C-183 and C-184; shielded; 1-13/64" x 2-37/64" x 3-7/16" high; Effective with serial #329.	First i-f transformer	13499 82066 Part #120563	503 4871 004 120563†††
Z-120*	R5950-151-7859-FCRC	TRANSFORMER: i-f; 450-550 kc; second i-f; shielded; 1-13/64" x 2-23/64" x 3-7/16" high.	Second i-f transformer	13499	502 7035 004
Z-120† ** †† *** ††† φθ ° °°	R5950-178-8197-E121	TRANSFORMER: i-f; 450-550 kc; consists of L-131, L-132, C-176, C-180 and C-181; shielded; 1-13/64" x 2-23/64" x 3-7/16" high; Effective with serial #329.	Second i-f transformer	13499 82066 Part #120565	503 4870 004 120565†††
Z-121*	R5950-151-7860-FCRC	TRANSFORMER: i-f; 450-550 kc; third i-f; shielded; 1-13/64" x 2-23/64" x 3-7/16" high.	Third i-f transformer	13499	502 7036 004
Z-121† ** †† *** ††† φθ ° °°	R5950-153-4974-E121	TRANSFORMER: i-f; 450-550 kc; consists of L-133, L-134, C-177, C-178 and C-179; shielded; 1-13/64" x 2-23/64" x 3-7/16" high; Effective with serial #329.	Third i-f transformer	13499 82066 Part #120564	503 4869 004 120564†††
Z-122	R5800-C02-6199-E111	FILTER: a-f band pass or low pass; band pass characteristics 300 cps; 3 db below 1000 cps response; 6500 cps 17 db or more below 1000 cps response; 1¾" x 2½" x 3¾", 3 plug terminals on side of case; 3 mtg holes tapped 6-32 NC-2 x ⅜" deep.	Audio filter	97965 Cat. 9444-1 82066 Part #121258	673 0189 00 121258†††

* Contract N5sa-8648
** Contract N0a(s)-51-103f
φ Contract N0a(s)-52-961
† Contract N0a(s)-9216
*** Contract N0a(s)-51-244a
θ Contract N0a(s)-52-1027
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
° Contract N0a(s)-51-259
°° Contract N0a(s)-53-983

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: RADIO RECEIVERS R-105/ARR-15 and R-105A/ARR-15

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	MFR. and DESIG. or AWS TYPE	CONT. or GOVT. DWG. or SPEC. No.
Z-123	R5950–433–7251–FCRC	COIL ASSEMBLY: consists of Z-101, Z-102, Z-103, Z-104, Z-105, Z-106, C-101, C-170, C-171, C-172, C-173, C-174, C-175 and E-113; 3" x 3" x 3⅛" max overall.	Antenna coil assembly	13499 82066 Part #121304	502 4615 004 121304†††
Z-124	R5950–424–9667–FCRC	COIL ASSEMBLY: consists of Z-107, Z-108, Z-109, Z-110, Z-111, Z-112, Z-113, Z-114, Z-115, Z-116, Z-117, Z-118, C-105, C-106, C-107, C-108, C-109, C-111, C-113, C-114, E-112; 2⅞" x 3⅛" x 5-3/16" max overall.	Bandpass coil assembly	13499 82066 Part #120704	502 4614 004 120704†††
Z-125	R5950–424–9487–FCRC	COIL ASSEMBLY: consists of L-101, C-139, C-141, C-142, C-143, E-114; 3½" x 3-9/16" x 1¾" max overall.	Multiplier coil assembly	13499 82066 Part #120519	502 6843 003 120519†††
Z-126	R5821–036–7206–FCRC	FILTER ASSEMBLY: Line; consists of box and cover assembly; C-146, C-147, C-148, C-149, C-150, C-151, C-152, C-153, C-154, C-155, C-156, C-157, C-158, C-159, C-160, C-161, C-162, C-163, C-164, C-165, C-166, C-167, L-103, L-104, L-105, L-106, L-107, L-108, L-109, L-110, L-111, L-112, L-113, L-114, L-115, L-116, L-117, L-118, L-119, L-120, L-121, L-122, L-123, L-124, L-125, L-126, J-108, K-101, P-101.	Power and control lead filter	13499 82066 Part #121250	502 4607 004 121250†††

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: LOW FREQUENCY OSCILLATOR

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	MFR. and DESIG. or AWS TYPE	CONT. or GOVT. DWG. or SPEC. No.
201–299 series	R5840–433–7217–FCRC	LF OSCILLATOR: Oscillator circuit components in a sealed enclosure.	bfo and calibration	13499 82066 Part #120772	502 0879 003 120772†††
C-201****	R16-C-8270-500	CAPACITOR: Fixed; flat; ceramic; 50 mm ±1 mmf; temp coef 0 ±30%; 500 volts dcw ½" x ⅝"; axial wire leads 1¼" long.	lf oscillator trimmer	71950 82066 Part #123085	913 0059 00 123085†††
C-201****	R16-C-8269-950	CAPACITOR: Fixed; flat; ceramic; 50 mm ±1 mmf; temp coef —200 ±15%; 500 volts dcw ⅝" x ½" x 3/32"; axial wire leads 1¼" long.	lf oscillator trimmer	71950 82066 Part #123086	913 0060 00 123036†††
C-201****	R16-C-8269-975	CAPACITOR: Fixed; flat; ceramic; 50 mm ±1 mmf; temp coef —400 ±15%; 500 volts dcw ⅝" x ½" x 3/32"; axial wire leads 1¼" long.	lf oscillator trimmer	71950 82066 Part #123087	913 0061 00 123087†††
C-201****	R16-C-8270	CAPACITOR: Fixed; flat; ceramic; 50 mm ±1 mmf; temp coef —600 ±15%; 500 volts dcw ⅝" x ½" x 3/32"; axial wire leads 1¼" long.	lf oscillator trimmer	71950 82066 Part #123088	913 0062 00 123088†††
C-201****	R16-C-7865-98	CAPACITOR: Fixed; flat ceramic; 20 mm ±1 mmf; temp coef 0, ±30 PPM/°C; 500 volts dcw; ⅝" x ½" x 3/32"; axial wire leads 1¼" long.	lf oscillator trimmer	71950 82066 Part #123083	913 0051 00 123083†††
C-201****	N16–C–16557–2771	CAPACITOR: Fixed, ceramic dielectric; 500 vdc working, 50 uuf ±2%; –800 uuf/uf/°C temp coef, ±120 uuf/uf/°C; 0.09375 in. by 0.395 in. by 0.520 in.	lf osc trimmer	71950 DA933–010(X)	913 0063 00
C-201****	N16–C–16557–2801	CAPACITOR: Fixed, ceramic, dielectric; 500 vdc working, 50 uuf ±2%; –1000 uuf/uf/°C temp coef, ±150 uuf/uf/°C; 0.09375 in. by 0.395 in. by 0.520 in.	lf osc trimmer	71950 DA933–011(X)	913 0064 00
C-202 C-202†††	R16-C-8352-555' R16-BNL-123073	CAPACITOR: Fixed; ceramic; 1700 mmf ±1%; temp coef neg 28.5 ±10 PPM/°C; 500 volts dcw; 15/16" dia x 15/16" long with 6-32; NC-2 stud.	lf oscillator trimmer	71950 82066 Part #123073	913 0075 00 123073†††

* Contract N5sa-8648
** Contract N0a(s)-51-103f
**** Capacitor is individually chosen to fulfill the operating requirements of each oscillator.
ϕ Contract N0a(s)-52-961
† Contract N0a(s)-9216
*** Contract N0a(s)-51-244a
θ Contract N0a(s)-52-1027
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
° Contract N0a(s)-51-259
°° Contract N0a(s)-53-983

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: LOW FREQUENCY OSCILLATOR

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	DESIG. or AWS TYPE MFR. and	CONT. or GOVT. DWG. or SPEC. No.
C-203	R5910-649-5094-E111	CAPACITOR: Variable; ceramic; 50 mmf; temp coef 0 ±100 PPM/°C; 500 volts dcw; 15/16" x 1-1/16" x .581".	lf oscillator tuning	71950 Cat. 823-BZ	917 1001 00
C-204	R16-C-7861-54	CAPACITOR: Fixed; flat; ceramic; 100 mmf ±2 mmf; temp coef 0 ±30%; 500 volts dcw; 5/8" x 1/2" x 5/32"; with axial wire leads 1 1/4" long.	lf oscillator grid coupling	71950	913 0067 00
C-205	R16-C-8270-500	CAPACITOR: Fixed; flat; ceramic; 50 mmf ±1 mmf; temp coef 0 ±30%; 500 volts dcw; 5/8" x 1/2" x 3/32"; axial wire leads 1 1/4" long.	lf oscillator grid shunt	71950	913 0059 00
C-206*	R16-C-10232-500	CAPACITOR: Fixed; mica; 1800 mmf ±1%; temp coef neg ±100 PPM/°C; 500 volts dcw; 3/16" x 9/16" x 1-1/16"; axial wire leads 1 1/4" long.	lf oscillator screen by-pass	78272	912 0291 00
C-206† °° †† ** *** ° φθ		CAPACITOR: Fixed, mica; 1800 uuf ±5%; 500 vdc working; temp coef characteristic B; 9/32 in. by 53/64 in. by 53/64 in.; Effective with serial #349	lf oscillator screen by-pass	CM30B182J	MIL-C-5 935 4063 00
		CAPACITOR: Fixed, mica; 1800 uuf ±5%; 500 vdc working; temp coef characteristic B; 9/32 in. by 53/64 in. by 53/64 in.	lf oscillator screen by-pass	CM30B182J	MIL-C-5 935 4063 00
C-207*	R16-C-10232-500	CAPACITOR: Fixed; mica; 1800 mmf ±1%; temp coef neg ±100 PPM/°C; 500 volts dcw; 3/16" x 9/16" x 1-1/16"; axial wire leads 1 1/4" long.	lf oscillator line filter	78272	912 0291 00
C-207† †† ** *** ° φθ		CAPACITOR: Fixed, mica; 1800 uuf ±5%; 500 vdc working; temp coef characteristic B; 9/32 in. by 53/64 in. by 53/64 in.; Effective with serial #349	lf oscillator line filter	CM30B182J	MIL-C-5 935 4063 00
		CAPACITOR: Fixed, mica; 1800 uuf ±5%; 500 vdc working; temp coef characteristic B; 9/32 in. by 53/64 in. by 53/64 in.	lf oscillator line filter	CM30B182J	MIL-C-5 935 4063 00

C-208*	R16-C-10232-500	CAPACITOR: Fixed; mica; 1800 mmf ±1%; temp coef neg ±100 PPM/°C; 500 volts dcw; 3/16" x 9/16" x 1-1/16"; axial wire leads 1¼" long.	If oscillator output coupling	78272	912 0291 00
C-208† †† ** *** ° φθ		CAPACITOR: Fixed, mica; 1800 uuf ±5%; 500 vdc working; temp coef characteristic B; 9/32 in. by 53/64 in. by 53/64 in.; Effective with serial #349	If oscillator	CM30B182J	MIL-C-5 935 4063 00
C-208†††		CAPACITOR: Fixed, mica; 1800 uuf ±5%; 500 vdc working; temp coef characteristic B; 9/32 in. by 53/64 in. by 53/64 in.	If oscillator	CM30B182J	MIL-C-5 935 4063 00
E-201	R5950-360-6082-FCRC	CORE: powdered iron mix Aladdin #560; .502" dia x 1.343" long; w/lead screw sleeve; includes L-201 as a matched assembly.	If oscillator tuning	71950 82066 Part #121317	502 1315 003 121317†††
L-201		COIL: Part of E-201.			
O-201	R5310-433-7240-FCRC	GASKET: osc seal washer; moulded neoprene rubber insert bonded to stainless steel washer .5" OD 5/32" ID x .065" thick max overall.	Adjustment cover screw seal	71950 82066 Part #121427	502 4286 001 121427†††
O-202	R5310-433-7239-FCRC	GASKET: osc seal washer; moulded neoprene rubber insert bonded to stainless steel washer .31" OD x .06" ID x .065" thick max overall.	Connector retaining screw seal	71950 82066 Part #121428	502 4285 001 121428†††
O-203	R5310-433-7238-FCRC	GASKET: osc seal washer; moulded neoprene rubber insert bonded to stainless steel washer .24" OD .06" ID x .065" thick max overall.	Tube cover retaining screw seal	71950 82066 Part #121429	502 4284 001 121429†††
O-204†††	R16-BNL-122572	SEAL, rotary pressure: Spring loaded, ⅞" dia x 61/64" lg o/a.	Oscillator cover seal	82066 Part #122572	122572†††
O-205†††	R16-S-8787-5000	SPRING: 34 turns B & S #4 ga spring temper brass wire, approx 11/16" lg x 13/64" ID.	Prevents backlash of E-201	82066 Part #122502	122502†††
P-201	R5935-258-1057-FCRC	CONNECTOR: Oscillator Cover; 4 terminal plug plate; 1" wide x 1⅝" long x 1" thick overall; with bonded neoprene gasket.	If oscillator cover connector	71950 82066 Part #121426	502 4287 002 121426†††
P-202	R5935-295-6512-FCRC	CONNECTOR: Oscillator; 4 terminal receptacle 7/16" wide x 2⅛" long x 13/16" thick overall; low loss mica filled bakelite moulded in stainless steel saddle.	If oscillator connector	13499 82066 Part #121568	502 5037 002 121568†††

* Contract N5sa-8648
** Contract N0a(s)-51-103f
† Contract N0a(s)-9216
*** Contract N0a(s)-51-244a
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
° Contract N0a(s)-51-259
°° Contract N0a(s)-53-983
**** Capacitor is individually chosen to fulfill the operating requirements of each oscillator.
φ Contract N0a(s)-52-961
θ Contract N0a(s)-52-1027

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: LOW FREQUENCY OSCILLATOR

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	DESIG. or AWS TYPE MFR. and	CONT. or GOVT. DWG. or SPEC. No.
R-201	R16-JAN-RC21BF154J	RESISTOR: Fixed; insulated metallized; 150,000 ohm ±5%; ½ w; .249" dia x .655" long; No. 20 AWG axial wire leads 1.625" long.	lf oscillator grid	RC21BF154J	MIL-R-11 745 2176 00
R-202	R16-JAN-RC21BF683J	RESISTOR: Fixed; insulated metallized; 68,000 ohm ±5%; ½ w; .249" dia x .655" long; No. 20 AWG axial wire leads 1.625" long.	lf oscillator screen	RC21BF683J	MIL-R-11 745 2162 00
R-203	R16-JAN-RC21BF152J	RESISTOR: Fixed; insulated metallized: 1500 ohm ±5%; ½ w; .249" dia x .655" long; No. 20 AWG axial wire leads 1.625" long.	lf oscillator plate	RC21BF152J	MIL-R-11 745 2092 00
V-201	N16-T-58331	ELECTRON Tube: pentode, amplifier; 12SG7Y	lf oscillator	12SG7Y	MIL-E-1C 254 0254 00
X-201*	R16-S-4671	SOCKET: Tube; standard; octal; low loss mica filled bakelite; 1-3/16" dia stainless steel mtg plate moulded in, 1.312" mtg/c.	Socket for V-201	02660 Type 88-8T	220 1860 00
X-201† †† ** *** ° °° φθ	R16-S-4671	SOCKET, TUBE: 8 contact std octal; low loss mica filled bakelite; 1-3/64" dia stainless steel mtg plate moulded in; 1.312" mtg/c; Effective with serial #329.	Socket for V-201	02660 Type 88-8TM	220 1005 00
X-201†††	R16-S-4671	SOCKET, TUBE: 8 contact std octal; low loss mica filled bakelite; 1-3/64" dia stainless steel mtg plate moulded in; 1.312" mtg/c.	Socket for V-201	02660 Type 88-8TM	

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: HIGH FREQUENCY OSCILLATOR

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	MFR. and DESIG. or AWS TYPE	CONT. or GOVT. DWG. or SPEC. No.
301–399 series	R5840–433–7218–FCRC	H-F OSCILLATOR: oscillator circuit components in a sealed enclosure.	Excites mixer tube and calibration	13499 82066 Part #120768	502 0962 003 120768†††
C-301	R16-C-8374-750	CAPACITOR: Fixed; ceramic; 520 mmf ±1%; temp coef neg 49.8 ±10 PPM/°C; 15/16" dia x 29/32" thick; max overall, 6-32 NC-2 mtg stud solder lug terminals.	hf oscillator trimmer	71950	913 0076 00
C-302****	R16-C-8270-500	CAPACITOR: Fixed; flat; ceramic; 50 mmf ±1 mmf; temp coef 0 ±30; 500 volts dcw; 1" x ½" x 3/32"; axial wire leads 1¼" long.	hf oscillator trimmer	71590 82066 Part #123085	913 0059 00 123085†††
C-302****	R16-C-7861-53	CAPACITOR: Fixed; flat; ceramic; 10 mmf ±1 mmf; temp coef 0 ±30 PPM/°C; 500 volts dcw; ⅝" x ½" x 3/32"; axial wire leads 1¼" long.	hf oscillator trimmer	71590 82066 Part #123075	913 0043 00 123075†††
C-302****	R16-C-7861-52	CAPACITOR: Fixed; flat; ceramic; 10 mmf ±1 mmf; temp coef —200 ±15%; 500 volts dcw; ⅝" x ½" x 3/32"; axial wire leads 1¼" long.	hf oscillator trimmer	71590 82066 Part #123076	913 0044 00 123076†††
C-302****	R16-C-7861-51	CAPACITOR: Fixed; flat; ceramic; 10 mmf ±1 mmf; temp coef —400 ±15%; 500 volts dcw; ⅝" x ½" x 3/32"; axial wire leads 1¼" long.	hf oscillator trimmer	71590 82066 Part #123077	913 0045 00 123077†††
C-302****	R16-C-7861-28	CAPACITOR: Fixed; flat; ceramic; 10 mmf ±1 mmf; temp coef —600 ±15%; 500 volts dcw; ⅝" x ½" x 3/32"; axial wire leads 1¼" long.	hf oscillator trimmer	71590 82066 Part #123078	913 0046 00 123078†††
C-302****	R5910–195–2569–E212	CAPACITOR: Fixed; flat; ceramic; 10 mmf ±1 mmf; temp coef —800 ±15%; 500 volts dcw; ⅝" x ½" x 3/32"; axial wire leads 1¼" long.	hf oscillator trimmer	71590 82066 Part #123079	913 0047 00 123079†††

* Contract N5sa-8648
** Contract N0a(s)-51-103f
**** Capacitor is individually chosen to fulfill the operating requirements of each oscillator.
ϕ Contract N0a(s)-52-961
† Contract N0a(s)-9216
*** Contract N0a(s)-51-244a
θ Contract N0a(s)-52-1027
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
° Contract N0a(s)-51-259
°° Contract N0a(s)-53-983

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: HIGH FREQUENCY OSCILLATOR

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	DESIG. or AWS TYPE MFR. and	CONT. or GOVT. DWG. or SPEC. No.
C-302****	R16-C-7861-26	CAPACITOR: Fixed; flat; ceramic; 10 mmf ±1 mmf; temp coef —1000 ±15%; 500 volts dcw; 5/8" x 1/2" x 3/32"; axial wire leads 1¼" long.	hf oscillator trimmer	71590 82066 Part #123080	913 0048 00 123080†††
C-302****	R16-C-7861-51-550	CAPACITOR: Fixed; flat; ceramic; 10 mmf ±1 mmf; temp coef —1200 ±15%; 500 volts dcw; 5/8" x 1/2" x 3/32"; axial wire leads 1¼" long.	hf oscillator trimmer	71590 82066 Part #123081	913 0049 00 123081†††
C-302****	R16-C-7861-51-775	CAPACITOR: Fixed; flat; ceramic; 10 mmf ±1 mmf; temp coef —1400 ±15%; 500 volts dcw; 5/8" x 1/2" x 3/32"; axial wire leads 1¼" long.	hf oscillator trimmer	71590 82066 Part #123082	913 0050 00 123082†††
C-302****	R16-C-7865-98	CAPACITOR: Fixed; flat; ceramic; 20 mmf ±1 mmf; temp coef 0 ±30; 500 volts dcw; 5/8" x 1/2" x 3/32"; axial wire leads 1¼" long.	hf oscillator	71590 82066 Part #123083	913 0051 00 123083†††
C-302****	R16-C-7865-97-500	CAPACITOR: Fixed; flat; ceramic; 20 mmf ±1 mmf; temp coef —200 ±15%; 500 volts dcw; 5/8" x 1/2" x 3/32"; axial wire leads 1¼" long.	hf oscillator	71590 82066 Part #123084	913 0052 00 123084†††
C-303	R5910-188-1143-E212	CAPACITOR: Variable; air; 25 mmf max, 4 mmf min; 1-9/16" x 13/64" x 41/64" max over-all.	hf oscillator tuning	28050 Type Apc-50	922 4500 00
C-304	R16-C-7861-54	CAPACITOR: Fixed; flat ceramic; 100 mmf ±2 mmf; temp coef 0 ±30; 500 volts dcw; 5/8" x 1/2" x 5/32" with axial wire leads 1¼" long.	hf oscillator grid coupling	71950	913 0067 00
C-305	R16-C-8270-500	CAPACITOR: Fixed; flat; ceramic; 50 mmf ±1 mmf; temp coef 0 ±30; 500 volts dcw; 5/8" x 1/2" x 3/32"; axial wire leads 1¼" long.	hf oscillator grid shunt	71950	913 0059 00
C-306*	R16-C-10232-500	CAPACITOR: Fixed; mica; 1800 mmf ±1%; temp coef neg ±100 PPM/°C; 500 volts dcw; 3/16" x 9/16" x 1-1/16"; axial wire leads 1¼" long.	hf oscillator plate by-pass	78272	912 0291 00

C-306† ** †† *** ††† ° φθ °°		CAPACITOR: Fixed, mica; 1800 uuf ±5%; 500 vdc working; temp coef characteristic B; 9/32 in. by 53/64 in. by 53/64 in.; Effective with serial #349	hf oscillator plate by-pass	CM30B182J	MIL-C-5 935 4063 00
C-307*	R16-C-10232-500	CAPACITOR: Fixed; mica; 1800 mmf ±1%; temp coef neg ±100 PPM/°C; 500 volts dcw; 3/16" x 9/16" x 1-1/16"; axial wire leads 1¼" long	hf oscillator screen by-pass	78272	912 0291 00
C-307† °° †† ** φθ *** °		CAPACITOR: Fixed, mica; 1800 uuf ±5%; 500 vdc working; temp coef characteristic B; 9/32 in. by 53/64 in. by 53/64 in.; Effective with serial #349	hf oscillator screen by-pass	CM30B182J	MIL-C-5 935 4063 00
C-307†††		CAPACITOR: Fixed, mica; 1800 uuf ±5%; 500 vdc working; temp coef characteristic B; 9/32 in. by 53/64 in. by 53/64 in.	LF oscillator line filter	CM30B182J	MIL-C-5 935 4063 00
C-308*	R16-C-10232-500	CAPACITOR: Fixed; mica; 1800 mmf ±1%; temp coef neg ±100 PPM/°C; 500 volts dcw; 3/16" x 9/16" x 1-1/16"; axial wire leads 1¼" long.	hf oscillator multiplier coupling	78272	912 0291 00
C-308† °° †† φθ ** ° ***		CAPACITOR: Fixed, mica; 1800 uuf ±5%; 500 vdc working; temp coef characteristic B; 9/32 in. by 53/64 in. by 53/64 in.; Effective with serial #349	hf oscillator multiplier coupling	CM30B182J	MIL-C-5 935 4063 00
C-308†††		CAPACITOR: Fixed, mica; 1800 uuf ±5%; 500 vdc working; temp coef characteristic B; 9/32 in. by 53/64 in. by 53/64 in.	hf oscillator multiplier coupling	CM30B182J	MIL-C-5 935 4063 00
E-301* †	R5950-369-6090-FCRC	CORE: powdered iron; mix Aladdin #560; ½" dia x 1½" long; w/lead screw sleeve; and L-301 as a matched assembly.	hf oscillator tuning	13499 82066 Part #121316	
E-301** °° *** †† ° φθ †††	R5821-036-6375-FANN	SUB-ASSEMBLY: HF Oscillator Tuning Coil and Core Assembly.	hf oscillator tuning	13499	502 1316 003
E-301	R16-CR-504-0927-003	oil SUBASSEMBLY: hf osc tuning coil and core assembly	HF ocs tuning	13499	504 0927 003
L-301		COIL: Part of E-301.			
L-302	R5950-237-1533-FCRC	COIL: rf choke; 66μh; single section; universal wound of No. 30 SSE copper wire; on a special ceramic form; ⅝" dia. x 1" long overall.	hf oscillator plate choke	13499 82066 Part #121461	502 0934 001 121461†††

* Contract N5sa-8648 † Contract N0a(s)-9216 †† Contract N0a(s)-9972 ††† Contract N0a(s)-10901
** Contract N0a(s)-51-103f *** Contract N0a(s)-51-244a ° Contract N0a(s)-51-259
**** Capacitor is individually chosen to fulfill the operating requirements of each oscillator. °° Contract N0a(s)-53-983
φ Contract N0a(s)-52-961 θ Contract N0a(s)-52-1027

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: HIGH FREQUENCY OSCILLATOR

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	DESIG. or AWS TYPE MFR. and	CONT. or GOVT. DWG. or SPEC. No.
O-301	R5310-433-7240-FCRC	GASKET: osc seal washer; moulded Neoprene rubber insert bonded to stainless steel washer .5" OD; 5/32" ID x .065" thick max overall.	Adjustment cover screw seal	13499 82066 Part #121427	502 4286 001 121427†††
O-302	R5310-433-7239-FCRC	GASKET: osc seal washer; moulded Neoprene rubber insert bonded to stainless steel washer .31" OD; .06" ID x .065" thick max overall.	Connector retaining screw seal	13499 82066 Part #121428	502 4285 001 121428†††
O-303	R5310-433-7238-FCRC	GASKET: osc seal washer; moulded Neoprene rubber insert bonded to stainless steel washer .24" OD; .06" ID x .065" thick max overall.	Tube cover retaining screw seal	13499 82066 Part #121429	502 4284 001 121429†††
O-304†††	R16-BNL-122572	SEAL, rotary pressure: spring loaded, 7/8" dia x 61/64" lg o/a.	Oscillator cover seal	82066 Part #122572	122572†††
O-305†††	R16-S-8861-5000	SPRING ASSEMBLY: Consists of 3 compensating springs soldered to washer, 7/16" OD x 2-9/16" lg o/a.	Prevents backlash and provides ground for E-301	82066 Part #121283	121283†††
O-306†††		GUIDE, shaft: Consists of 3/16" dia rod laminated phenolic LTS-E-4 (JAN-P-13) and groove pin, 3/8" dia x 2¼" lg o/a.	Mounting for O-305	82066 Part #121464	121464†††
O-307†††	R16-BNL-121487	COMPENSATOR, linearity: Consists of 65 plates and 66 washers alternately stacked, 2-7/16" lg x ½" h x 9/16" wd o/a.	Compensation for deviation from straight line tuning of L-301	82066 Part #121487	121487†††
P-301	R5935-258-1057-FCRC	CONNECTOR: oscillator cover; 4 terminal plug plate; 1" wide x 1⅝" x 1" thick overall; with bonded Neoprene gasket.	hf oscillator cover connector	13499 82066 Part #121426	502 4287 002 121426†††
P-302	R5935-295-6512-FCRC	CONNECTOR: oscillator; 4 terminal receptacle; 7/16" wide x 2⅛" long x 13/16" thick overall; low loss mica filled bakelite moulded in stainless steel saddle.	hf oscillator connector	13499 82066 Part #122568	502 5037 002 122568†††
R-301	R16-R-17348-15	RESISTOR: Fixed; insulated metallized; 150,000 ohm ±5%; ½ w; .249" dia x .655" long; No. 20 AWG axial wire leads 1.625" long.	hf oscillator grid	RC21BF154J	MIL-R-11 745 2176 00
R-302	R16-R-17399-6	RESISTOR: Fixed; insulated metallized; 68,000 ohm ±5%; ½ w; .249" dia x .655" long; No. 20 AWG axial wire leads 1.625" long.	hf oscillator screen	RC21BF683J	MIL-R-11 745 2162 00

R-303	R16-JAN-RC21BF473J	RESISTOR: Fixed; insulated composition; 47,000 ohm ±5%; ½ w; .249" dia x .655" long; No. 21 AWG axial wire leads 1.625" long.	hf oscillator multiplier grid	RC21BF473J	MIL-R-11 745 2155 00
R-304	R16-JAN-RC10BF102M	RESISTOR: Fixed; insulated composition; 1000 ohm ±20%; ¼ w; .17" dia x .406" long; No. 21 AWG axial wire leads 1.625" long.	hf oscillator output equalizing	RC10BF102M	MIL-R-11 745 0087 00
V-301	N16-T-58331	ELECTRON Tube: pentode, amplifier; 12SG7Y	hf oscillator	12SG7Y	MIL-E-1C 254 0254 00
X-301*	R16-S-4671	SOCKET: Tube; standard octal; low loss mica filled bakelite; 1-3/16" dia stainless steel mtg plate moulded in, 1.312" mtg/c.	Socket for V-301	02660 88-8T	220 1860 00
X-301† †† ††† ** *** ° φθ °°	R16-S-4671	SOCKET, tube: 8 contact std octal; low loss mica filled bakelite; 1-3/64" dia stainless steel mtg plate moulded in; 1.312" mtg/c; Effective with serial #329.	Socket for V-301	02660 Type 88-8TM	220 1005 00

* Contract N5sa-8648
† Contract N0a(s)-9216
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
** Contract N0a(s)-51-103†
*** Contract N0a(s)-51-244a
° Contract N0a(s)-51-259
**** Capacitor is individually chosen to fulfill the operating requirements of each oscillator.
°° Contract N0a(s)-53-983
φ Contract N0a(s)-52-961
θ Contract N0a(s)-52-1027

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: CFI ASSEMBLY

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	DESIG. or AWS TYPE MFR. and	CONT. or GOVT. DWG. or SPEC. No.
401–499 series	R5821–240–3898–E121	CFI ASSEMBLY: two stage, oscillator and distorter, using 100 kc crystal.	Receiver calibration	13499 82066 Part #120618	520 3496 00 120618†††
C-401		CAPACITOR: Fixed, ceramic dielectric; 500 vdc working, 270 uuf ±5%; −330 uuf/uf/°C, +60 uuf/uf/°C; tubular, 0.315 in. dia by 1.165 in. lg	cfi oscillator trimmer	CC35SH271J	JAN–C–20A 916 5155 00
C-402	R16-C-10491	CAPACITOR: Fixed; mica dielectric; .01 mf ±20%; 300 volts dcw; 11/32" x 53/64" x 53/64"; No. 18 AWG axial wire leads 1⅛" long.	cfi oscillator screen by-pass	CM35B103M	MIL–C–5 935 2118 00
C-403	R16-C-10346-72	CAPACITOR: Fixed; mica dielectric; 3900 mmf ±5%; 500 volts dcw; 11/32" x 53/64" x 53/64" max overall; No. 18 AWG axial wire leads 1⅛" long.	cfi oscillator plate by-pass	CM35B392J	MIL–C–5 935 2099 00
C-404	R16-C-10491	CAPACITOR: Fixed; mica dielectric; .01 mf ±20%; 300 volts dcw; 11/32" x 53/64" x 53/64"; No. 18 AWG axial wire leads 1⅛" long.	cfi oscillator filament by-pass	CM35B103M	MIL–C–5 935 2118 00
C-405	R16-C-10491	CAPACITOR: Fixed; mica dielectric; .01 mf ±20%; 300 volts dcw; 11/32" x 53/64" x 53/64"; No. 18 AWG axial wire leads 1⅛" long.	cfi oscillator plate filter	CM35B103M	MIL–C–5 935 2118 00
C-406	R16-C-10491	CAPACITOR: Fixed; mica dielectric; .01 mf ±20%; 300 volts dcw; 11/32" x 53/64" x 53/64"; No. 18 AWG axial wire leads 1⅛" long.	cfi multiplier screen by-pass	CM35B103M	MIL–C–5 935 2118 00
C-407		CAPACITOR: Fixed, ceramic dielectric; 500 vdc working, 5.0 uuf ±1 uuf; −330 uuf/uf/°C, +60 uuf/uf/°C; tubular, 0.200 in. dia by 0.400 in. lg	cfi output plate coupling	CC20SH050F	JAN–C–20A 916 0329 00
C-408	R16-C-10018-117-80	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; oper temp·−50°C to + 85°C; 500 volts dcw; 29/64" x 11/32" max overall with solder lug terminals.	cfi oscillator-multiplier coupling	71950 Type 830	912 0282 00

C-409	R16-C-10491	CAPACITOR: Fixed; mica dielectric; .01 mf ±20%; 300 volts dcw; 11/32" x 53/64" x 53/64" max overall; No. 18 AWG axial wire leads 1⅛" long.	cfi oscillator feedback	CM35B103M	MIL-C-5 935 2118 00
C-410	R16-C-10018-117-80	CAPACITOR: Fixed; silver mica; 500 mmf ±20%; oper temp —50°C to +85°C; 500 volts dcw; 29/64" x 11/32" max overall with solder lug terminals.	cfi oscillator plate tank	71950 Type 830	912 0282 00
E-401	R5940-561-2129-FCRC	BOARD, TERMINAL: 22 silver plated brass terminal pins; 7/16" x 2-7/16" x 4-9/16" max overall.	cfi resistor board mounts C-403, C-407, C-409, L-402, R-403, R-404, R-405, R-406 and R-407	13499 82066 Part #120546	502 4604 003 120546†††
L-401		Not used.			
L-402	R5950-228-8154-FCRC	COIL: rf Choke; 1.3 μh ±10%; single layer winding; No. 30 AWG enam copper wire; .225" dia x ⅞" long max overall; Aladdin #520; powdered iron core; with No. 16 wire leads moulded into ends.	cfi multiplier plate choke	70229 82066 Part #121207	240 0024 00 121207†††
L-403	R5950-041-2148-FCRC	COIL: 3.5 μh ±10%; one or two sections; universal wound of No. 34 enam copper wire; ⅞" x 1" x 5/16" overall max; Aladdin powdered iron core #520; .375" dia x ⅞" long with 8-32 stud moulded in end.	cfi oscillator plate tank	70229	278 0012 00
L-403†††	R5950-041-2148-FCRC	COIL: 3.5 μh ±10%; one or two sections; universal wound of No. 32 SSE copper wire; ⅞" x 1" x 5/16" overall max; Aladdin powdered iron core #520; .375" dia x ⅞" long with 8-32 stud moulded in end.	cfi oscillator plate tank	82066 Part #121205	121205†††
P-401	R5935-305-2333-E111	CONNECTOR: 3 connectors, 2 banana plugs and 1 pin receptacle.	cfi power connector	13499 82066 Part #120615	502 4487 002 120615†††
R-401	N16-R050632-0416	RESISTOR: Fixed; insulated; composition; 100,000 ohm ±20%; ½ w; .249" dia x .468" long; No. 21 AWG axial wire leads 1.625" long.	cfi oscillator grid	RC20BF104M	MIL-R-11 745 1171 00
R-402	N16-R050479-0435	RESISTOR: Fixed; insulated; composition; 47,000 ohm ±20%; ½ w; .249" dia x .468"; No. 21 AWG axial wire leads 1.625" long.	cfi multiplier grid	RC20BF473M	MIL-R-11 745 1157 00

* Contract N5sa-8648
** Contract N0a(s)-51-103f
ϕ Contract N0a(s)-52-961
† Contract N0a(s)-9216
*** Contract N0a(s)-51-244a
θ Contract N0a(s)-52-1027
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
° Contract N0a(s)-51-259
°° Contract N0a(s)-53-983

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: CFI ASSEMBLY

Reference Symbol	Army Stock Number / Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	DESIG. or AWS TYPE MFR. and	CONT. or GOVT. DWG. or SPEC. No.
R-403	R16-JAN-RC20BF333M	RESISTOR: Fixed; insulated; composition; 33,000 ohm ±20%; ½ w; .249" dia x .468"; No. 21 AWG axial wire leads 1.625" long.	cfi oscillator plate	RC20BF333M	MIL-R-11 745 1150 00
R-404	N16-R051064-0431	RESISTOR: Fixed; insulated; composition; 220,000 ohm ±20%; ½ w; .249" dia x .468"; No. 21 AWG axial wire leads 1.625" long.	cfi multiplier screen	RC20BF224M	MIL-R-11 745 1185 00
R-405	R16-JAN-RC30BF104M	RESISTOR: Fixed; insulated; composition; 100,000 ohm ±20%; 1 w; .28" dia x .75" long; No. 20 AWG axial wire leads 1.625" long.	cfi multiplier plate voltage divider	RC30BF104M	MIL-R-11 745 3171 00
R-406	R16-R-17281-160	RESISTOR: Fixed; insulated; composition; 4700 ohm ±20%; ½ w; .249" dia x .468"; No. 21 AWG axial wire leads 1.625" long.	cfi multiplier plate voltage divider	RC20BF472M	MIL-R-11 745 1115 00
R-407	N16-R050479-0435	RESISTOR: Fixed; insulated; composition; 47,000 ohm ±20%; ½ w; .249" dia x .468"; No. 21 AWG axial wire leads 1.625" long.	cfi oscillator screen	RC20BF473M	MIL-R-11 745 1157 00
V-401	N16-T-58331	ELECTRON Tube: pentode, amplifier; 12SJ7.	cfi oscillator	12SJ7	MIL-E-1C 254 0254 00
V-402	N16-T-58331	ELECTRON Tube: pentode, amplifier; 12SJ7.	cfi oscillator	12SJ7	MIL-E-1C 254 0254 00
X-401*	R16-S-4671	SOCKET: Tube; std octal; low loss mica filled bakelite; 1-3/64" x 25/32" overall; stainless steel plate moulded in, 1.312" mtg/c.	Socket for V-101	02660	220 1005 00
X-401† °° †† ††† ** *** ° φθ	N16-S-63511-1961	SOCKET: Tube; std octal; ceramic; 1-13/16" dia x 13/16" max; w/cad plated mtg ring; 1⅝" mtg centers; Effective with serial #329.	Socket for V-401	76649	220 1012 00
X-402*	R16-S-4671	SOCKET: Tube; std octal; low loss mica filled bakelite; 1-3/64" x 25/32" overall; stainless steel plate moulded in, 1.312" mtg/c.	Socket for V-102	02660	220 1005 00

X-402† °° †† ††† ** *** ° φθ	N16-S-63511-1961	SOCKET: Tube; std octal; ceramic; 1-13/16" dia x 13/16" max; w/cad plated mtg ring; 1-5/16" mtg centers; Effective with serial #329.	Socket for V-402	76649	220 1012 00
X-403*	R13-S-4671	SOCKET: Tube; std octal; low loss mica filled bakelite; 1-3/64" x 25/32" overall; stainless steel plate moulded in, 1.312" mtg/c.	Socket for V-102	02660	220 1005 00
X-403† °° †† ††† ** *** ° φθ	N16-S-63511-1961	SOCKET: Tube; std octal; ceramic; 1-13/16" dia x 13/16" max; w/cad plated mtg ring; 1-5/16" mtg centers; Effective with serial #329.	Socket for Y-401	76649	220 1012 00
Y-401	R5955-251-4118-E111	CRYSTAL: 100 kc; metal holder; 1.32" dia x 2.56" long; w/small wafer octal base; crystal electrodes connected to pins 3 and 7.	cfi frequency control	77885 75378 Type T-9†††	291 0004 00

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φ Contract N0a(s)-52-961
† Contract N0a(s)-9216
*** Contract N0a(s)-51-244a
θ Contract N0a(s)-52-1027
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
° Contract N0a(s)-51-259
°° Contract N0a(s)-53-983

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: RELAY UNIT ASSEMBLY

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	MFR. and DESIG. or AWS TYPE	CONT. or GOVT. DWG. or SPEC. No.
501–599 series	R5945–240–4378–D334	RELAY UNIT ASSEMBLY: Includes two relays and coupling capacitor.	Receiver function control	13499 82066 Part #120766	502 6798 002 120766†††
C-501		CAPACITOR: Fixed, ceramic dielectric; 500 vdc working, 36 uuf ±5%; −330 uuf/uf/°C, +60 −180 uuf/uf/°C; tubular, 0.240 in. dia by 0.460 in. lg.	Calibration input	CC30SH360J	JAN-C-20A 916 4930 00
J-501†††	R16-BNL-120604	CONNECTOR, female contact: 1 round female contact, 13/16" dia x ½" lg.	For connecting K-502 with CFI unit	82066 Part #121247	121247†††
K-501* †	R5945–230–2038–E121	RELAY: MCW-CW, CAL; (1A, 2B) three pole; one normally open and two normally closed; 29/32" x 1-5/16" x 1½" high max overall, palladium contacts; 1 amp non-inductive load; ½ amp inductive load; coil voltage 26.5 v nom; two mounting holes in end tapped 4-40 NC-2.	mcw, cw, calibrate control	77523	972 1010 00
K-501†† ††† ** *** ° φθ °°	R5945–237–1700–D334	RELAY, ARMATURE: (1A, 2B); three pole, one NO and two NC; contact rating make or break 25 w ½ amp non-inductive load; gold alloy contacts; 29/32" x 1-5/16" x 1½" high max overall; coil voltage 26.5 v nom; two mounting holes in end tapped 4-40 NC-2; Effective with serial #1.	mcw, cw, calibrate control	77523 82066 Part #122597	972 1088 00 122597†††
K-502* †	R5945–230–2060–E121	RELAY: CAL-RECEIVE; (4C) four pole double throw; .84" x 1-3/32" x 1-5/32" high overall palladium contacts; 1 amp non-inductive load; ½ amp inductive load; coil voltage 26.5 v nom; two mounting holes in end tapped 4-40 NC-2.	Calibrate, receive control	77523	972 1008 00
K-502†† ††† ** *** ° φθ °°	R5945–189–3078–D334	RELAY, ARMATURE: (4C) four pole double throw; contact rating make or break 25 w ½ amp non-inductive load; gold alloy contacts; .84" x 1-3/32" x 1-5/32" high overall; coil voltage 26.5 v nom; two mounting holes in end tapped 4-40 NC-2; Effective with serial #1.	Calibrate, receive control	77523 82066 Part #122598	972 1089 00 122598†††
P-501	R5935–433–7310–FCRC	CONNECTOR: relay unit; 10 staked terminal plug pins; 1-5/16" wide x 4" long x 3/32" thick; laminated phenolic type LTS-E-2 (JAN-P-13).	Relay unit connector	13499	502 6790 002
P-501†††	R5935–433–7310–FCRC	CONNECTOR: relay unit; 10 staked terminal plug pins; 1-5/16" wide x 4" long x 3/32" thick; laminated phenolic type LTS-E-4 (JAN-P-13).	Relay unit connector	82066 Part #121251	121251†††

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: DYNAMOTOR ASSEMBLY

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	MFR. and DESIG. or AWS TYPE	CONT. or GOVT. DWG. or SPEC. No.
601–699 series †††	R5800–C03–2333–FANN	DYNAMOTOR ASSEMBLY: hv dynamotor.		13499 82066 Part #121230	502 6782 002 121230†††
601–699 series		DYNAMOTOR: 26.5 vdc at 1.85 amp input, 220 vdc at 1.0 amp output; incl motor, brushes, saddle and mtg plate; 2¾ in. by 4-5/16 in. by 4-13/16 in. overall.	hv dynamotor	13499 (Dynamotor Vendor 66099)	522 0888 003
601–699 series		DYNAMOTOR: 28 vdc at 1.4 amp input, 220 vdc at 0.080 amp output; incl motor, brushes, saddle and mtg plate; 2¾ in. by 4-5/16 in. by 4-13/16 in. overall.	hv dynamotor	13499 (Dynamotor Vendor 80029)	522 0889 003
C–601	R16–C–10478–1	CAPACITOR: Fixed; 8200 mmf ±10%; 300 wv mica; molded case 17/32" x 53/64" x 53/64" overall; axial wire leads 1⅛" long.	hv filter	CM35B822K	MIL–C–5 935 2114 00
C–601		CAPACITOR: Fixed, ceramic dielectric; 300 vdc working; 10,000 uuf.	hv filter	80029 Part #44208-1	234 0550 00
C–602	R16–C–10478–1	CAPACITOR: Fixed; 8200 mmf ±10%; 300 wv mica; molded case 17/32" x 53/64" x 53/64" overall; axial wire leads 1⅛" long.	Input filter	CM35B822K	MIL–C–5 935 2114 00
C–602		CAPACITOR: Fixed, paper dielectric; 500 vdc working; 6200 uuf.	Input filter	80029 Part #44208-2	234 0549 00
D–601	R6125–251–3419–E111 Completely interchangeable with R6125–635–5458–E111	DYNAMOTOR: 26.5 vdc input, 220 vdc at 0.1 amp output; incl motor, brushes and saddle; less mtg plate; 2-3/16 in. dia by 5½ in. lg overall.	hv dynamotor	13499 (Dynamotor Vendor 50133 or 88667)	503 9429 001
D–601		DYNAMOTOR: 26.5 vdc at 1.85 amp input, 220 vdc at 1.0 amp output; incl motor, brushes and saddle; less mtg plate; 2¾ in. by 2-9/16 in. by 4⅞ in. overall.	hv dynamotor	13499 (Dynamotor Vendor 80029)	542 2994 00

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** Contract N0a(s)-51-103f
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† Contract N0a(s)-9216
*** Contract N0a(s)-51-244a
θ Contract N0a(s)-52-1027
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
° Contract N0a(s)-51-259
°° Contract N0a(s)-53-983

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: DYNAMOTOR ASSEMBLY

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	DESIG. or AWS TYPE MFR. and	CONT. or GOVT. DWG. or SPEC. No.
D-601	R6125-635-5458-E111	DYNAMOTOR: output 220 v at .1 amp; input 26.5 v; 2-3/16" dia x 5½" long max overall; p/o AN/ARR-15A receiver.	Receiver hv supply	50133 Type 8	231 0027 00
D-601	R6125-240-8370-E111	DYNAMOTOR: output 220 v at 0.80 amp; input 26.5 v; 2¾" dia x 4⅞" long max overall; p/o AN/ARR-15A receiver.		66099 Part #SS392	231 0041 00
D-601		DYNAMOTOR: 26.5 vdc at 1.85 amp input, 220 vdc at 1.0 amp output; 2¾ in. dia by 4¾ in. lg overall.	hv dynamotor	80029 Part #EWD2753	231 0099 00
D-601†††	R6125-251-3419-E111 Completely interchangeable with R6125-635-5458-E111	DYNAMOTOR: output 220 v at 0.1 amp; input 26.5 v; 2¾" dia x 5½" long max overall; p/o AN/ARR-15A receiver (complete with set of replacement brushes).	Receiver hv supply	82066 Part #122547	122547†††
E-601	R5977-165-8665-E111	BRUSH, ELECTRICAL CONTACT: carbon; positive hv brush; 3/32" x ¼" x 7/16"; complete with pigtail lead and spring.	Replacement for D-601 dynamotor	50133 Cat 24A30-1 82066 Part #122573	234 0133 00 122573†††
E-602	R5977-165-8665-E111	BRUSH, ELECTRICAL CONTACT: carbon; negative hv brush; 3/32" x ¼" x 7/16"; complete with pigtail lead and spring.	Replacement for D-601 dynamotor	50133 Cat 24A30-2 82066 Part #122574	234 0132 00 122574†††
E-603	R5977-178-8134-E111	BRUSH, ELECTRICAL CONTACT: carbon; positive input; 5/32" x ¼" x 7/16"; complete with pigtail lead and spring.	Replacement for D-601 dynamotor	50133 Cat. 24A13A-11 82066 Part #122575	234 0134 00 122575†††
E-604	R5977-178-8134-E111	BRUSH, ELECTRICAL CONTACT: carbon; negative input; 5/32" x ¼" x 7/16"; complete with pigtail lead and spring.	Replacement for D-601 dynamotor	50133 Cat 24A13A-12 82066 Part #122576	234 0137 00 122576†††
E-605	R5977-259-0556-FCRC	CAP, BRUSH HOLDER: molded bakelite; brass insert threaded ⅜-32; EF-2; .215" deep; 5/16" x 9/16" dia max overall.	Replacement for D-601 dynamotor	50133 Cat. 29A8 82066 Part #122577	234 0136 00 122577†††
E-605		CAP: Electrical; bakelite w/8 (0.164 in.)-32 thd brass insert; ¼ in. h by 9/16 in. dia overall.	Replacement for D-601 dynamotor	80029 Part #44209	234 0544 00

E–606	R5977–259–0556–FCRC	CAP, BRUSH HOLDER: molded bakelite; brass insert threaded ⅜–32; EF–2; .215" deep; 5/16" x 9/16" dia max overall.	Replacement for D–601 dynamotor	50133 Cat. 29A8 82066 Part #122577	234 0136 00 122577†††
E–606		CAP: Electrical; bakelite w/8 (0.164 in.)–32 thd brass insert; ¼ in. h by 9/16 in. dia overall.	Replacement for D–601 dynamotor	80029 Part #44209	234 0544 00
E–607	R5977–259–0556–FCRC	CAP, BRUSH HOLDER: molded bakelite; brass insert threaded ⅜–32; EF–2; .215" deep; 5/16" x 9/16" dia max overall.	Replacement for D–601 dynamotor	50133 Cat. 29A8 82066 Part #122577	234 0136 00 122577†††
E–607		CAP: Electrical; bakelite w/8 (0.164 in.)–32 thd brass insert ¼ in. h by 9/16 in. dia overall.	Replacement for D–601 dynamotor	80029 Part #44209	234 0544 00
E–608	R5977–259–0556–FCRC	CAP, BRUSH HOLDER: molded bakelite; brass insert threaded ⅜–32; EF–2; .215" deep; 5/16" x 9/16" dia max overall.	Replacement for D–601 dynamotor	50133 Cat. 29A8 82066 Part #122577	234 0136 00 122577†††
E–608		CAP: Electrical; bakelite w/8 (0.164 in.)–32 thd brass insert; ¼ in. h by 9/16 in. dia overall.	Replacement for D–601 dynamotor	80029 Part #44209	234 0544 00
E–609	R5820–497–0076–E111	HOLDER, BRUSH: low voltage; ½" dia x 13/16" max overall; ⅜"–32 thd one end; solder lug connector.	Replacement for D–601 dynamotor	50133 Cat. 38A14A–1 82066 Part #122581	234 0138 00 122581†††
E–610	R5820–497–0076–E111	HOLDER, BRUSH: low voltage; ½" dia x 13/16" max overall; ⅜"–32 thd one end; solder lug connector.	Replacement for D–601 dynamotor	50133 Cat. 38A14A–1 82066 Part #122581	234 0138 00 122581†††
E–611	R5820–497–0077–E111	HOLDER, BRUSH: +hv; ½" dia x 25/32" max overall; ⅜"–32 thd one end; solder lug connector.	Replacement for D–601 dynamotor	50133 Cat. 38A27A–1 82066 Part #122583	234 0139 00 122583†††
E–612	R5821–431–9439–E111	HOLDER, BRUSH: –hv; ½" dia x 25/32" max overall; ⅜"–32 thd one end; solder lug connector.	Replacement for D–601 dynamotor	50133 Cat. 38A14A–2 82066 Part #122583	234 0140 00 122583†††
E–613	R17–B–14201–10	BLADE, fan: .030" thk alloy steel cadmium pl 2½" dia x 7/16" lg o/a.	Air circulating for D–601 dynamotor	82066 Part #122578	122578†††
E–613		FAN: Centrifugal; steel, cadmium plated; 0.250 in. dia by 0.349 in. h over-all; 4 blades.	Replacement for D–601 dynamotor	80029 Part #33475	234 0944 00

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E-614		BRUSH: Electrical contact; 1 rectangular carbon brush; 3/32 in. by 1/4 in. by 7/16 in.; straight contact end w/ flat face; w/ shunt and cap w/ears type terminal; high voltage.	Replacement for D-601 dynamotor	80029 Part #SP 22459-5	234 0892 00
E-614		BRUSH: Electrical contact; 1 rectangular carbon brush; 5/32 in. by 1/4 in. by 7/16 in.; straight contact end w/ flat face; w/ shunt and cap w/ears type terminal; low voltage.	Replacement for D-601 dynamotor	80029 Part #SP 22459-6	234 0893 00
E-616		BRUSH Set: electrical contact; c/o 4 Eureka-Williams brushes and holder.	Replacement for D-601 dynamotor	13499	542 2995 002
E-617	R5940-501-5639-D336	CLIP: Electrical; ferrule style; phosphor bronze; 19/32 in. by 5/8 in. by 13/16 in.	Replacement for D-601 dynamotor	80302 Part #2020J	265 5010 00
P-601	R5935-305-2316-FCRC	CONNECTOR: 3 terminal plug board; 1 1/4" triangular x 3/4" overall; laminated phenolic type LTS-E-2 (JAN-P-13).	Dynamotor connector	13499 82066 Part #121547	502 6784 002 121547†††

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** Contract N0a(s)-51-103f
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† Contract N0a(s)-9216
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θ Contract N0a(s)-52-1027
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
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°° Contract N0a(s)-53-983

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: MOUNTING MT-461/ARR-15
MOUNTING MT-461A/ARR-15A

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	MFR. and DESIG. or AWS TYPE	CONT. or GOVT. DWG. or SPEC. No.
900–999* series** *** † †† °	R5800–C03–2521–FANN	SHOCKMOUNT: 4" x 10½" x 23-27/32" max overall.	Shock-reducing mounting rack	13499	502 4365 005
900–999 series†††	R16–AN–MT–461/ARR–15	SHOCKMOUNT: 4" x 10½" x 23-27/32" max overall.	Shock-reducing mounting rack	82066 Part #120516	120516†††
900–999 seriesφθ	R–16–AN–MT–461A/ARR-15A	MOUNT, vibration: rectangular mtg; 39½ lb load rating; 23-7/16" lg extended x 10⅝" wd x 4-11/16" h o/a; spring cushion; ss or monel holder; four 13/64" diam mtg holes on 1-15/15" x 15-3/16" mtg/c located ea of two trays; Robinson Avia type #1008–1.	Shock-reducing mounting rack		200 0495 00
900-999 series°°	R5800–C03–2521–FANN	SHOCKMOUNT: 4 in. by 10⅞ in. by 23-27/32 in. max overall.	Shock-reducing mounti.., rack	13499	505 3967 003
J–901* φθ † °° †† ** *** °	R5935–230–1484–D336	POWER CONNECTOR: female contact; 24 round contacts; 4-15/16" x 2" x 2½"; molded plastic insert; special mounting to fit retainer in shockmount; Collins Radio part #502 4365 005.	Power and control connector (mates P–101)	13499	502 4349 003
J–901†††	R17–R–1959–30	POWER CONNECTOR: female contact; 24 round contacts; 4-15/16" x 2" x 2½"; molded plastic insert; special mounting to fit retainer in shockmount.		82066 Part #122565	122565†††

* Contract N5sa-8648
** Contract N0a(s)-51-103f
φ Contract N0a(s)-52-961
† Contract N0a(s)-9216
*** Contract N[illegible](s)-51-244a
θ Contract N0a(s)-52-1027
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
° Contract N0a(s)-51-259
°° Contract N0a(s)-53-983

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: RADIO SET CONTROL C-733/ARR-15A

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	MFR. and DESIG. or AWS TYPE	CONT. or GOVT. DWG. or SPEC. No.
1001-1099 series	R5821-036-6375-FANN	CONTROL, receiver: C-733/ARR-15A remote control for switching receiver to any one of 10 preset frequency channels; turns set on and off and removes control of receiver from local control or other remote units; used with AN/ARR-15 or AN/ARR-15A Receiver; aluminum case, black front panel, edge lighting of controls; approx. weight 1.7 lb without plug; 5¾" wide x 2¼" high x 5-11/32" deep without connector.	Remote control of AN/ARR-15A	13499	505 3680 003
A-1001		PLATE, mounting: aluminum; 5.750" x 2.250" x 3.250"; 4 Dzus fasteners.	Mounting for A-1003 and A-1004	13499	505 3685 003
A-1002	R5821-562-3596-FCRC	COVER, aluminum: 4.876" x 2.126" x 3.500"; 2 Dzus fasteners.	Dust cover	13499	505 3675 002
A-1003		PLATE, aluminum: 4½" x 1¾" x 3/16".	Mounting plate for J-1001	13499	505 3676 002
A-1004	R5820-090-3773-E121	PANELBOARD: plastic; transparent; 5.687" x 2.187" x .187".	Front panel	13499	505 3682 004
E-1001	R5820-212-7211-FCRC	KNOB: includes E-1001A and E-1001B.	Power switch knob	13499	505 3688 003
E-1001A	R5820-212-7210-FCRC	KNOB: round; aluminum; for ¼" dia shaft; two 6-40 NF-2 set screws; medium straight knurl; shaft hole 13/16" deep; part of E-1002.	Part of E-1002	13499	505 3671 002
E-1001B	R5821-561-6397-FCRC	KNOB: wing; alcoa alloy; black anodized finish; shaft hole .500" dia x 9/32" deep; part of E-1002.	Part of E-1002	13499	505 3669 002
E-1002	R6250-370-3961-D336	CAP: for XI-1001.	Retains I-1001	83564 Cat. 1617C	262 0233 00
E-1003	R6250-370-3961-D336	CAP: for XI-1002.	Retains I-1002	83564 Cat. 1617C	262 0233 00

* Contract N5sa-8648
** Contract N0a(s)-51-103f
φ Contract N0a(s)-52-961
† Contract N0a(s)-9216
*** Contract N0a(s)-51-244a
θ Contract N0a(s)-52-1027
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
° Contract N0a(s)-51-259
°° Contract N0a(s)-53-983

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SETS AN/ARR-15 and AN/ARR-15A

MAJOR ASSEMBLY: RADIO SET CONTROL C-733/ARR-15A

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	MFR. and DESIG. or AWS TYPE	CONT. or GOVT. DWG. or SPEC. No.
I-1001	R17-L-2126	LAMP, Incandescent: 28 v; .04 amp; clear; miniature flange base.	Illuminates E-1003	AN3140-327	Air Force Navy Aeronautical Drawing AN3140
I-1002	R17-L-2126	LAMP, Incandescent: 28 v; .04 amp; clear; miniature flange base.	Illuminates E-1002	AN3140-327	Air Force Navy Aeronautical Drawing AN3140
I-1003	R5820–036–7371–FCRC	DIAL: consists of plate and knob; black plexiglas; shaft hole .413" dia x 3/32" deep.	CHANNEL indicator	13499	505 3679 002
J-1001	R17-R-1726-130	CONNECTOR, receptacle: 19 round male contacts; 1⅝" x 1⅝" x 1¾" overall.	Main cable connector	AN3102A-22-14P	MIL-C-5015
O-1001	R5820–212–7209–FCRC	SPRING: torsion; stainless steel; used on E-1002.	Locks E-1002	13499	505 3666 001
O-1002		SWITCH SUB-ASSEMBLY: rotary; stainless steel, plain or cadmium plated steel; consists of .250" dia shaft and detent assembly; 1⅝" x 1½" x 1⅞" overall; part of S-1002.	Positions CHANNEL switch	76854	269 1352 00
P-1001	R17-P-4433-610-130	CONNECTOR: plug; 19 round female polarized contacts; 2-3/16" x 1-9/32" outside dia.	External power connector	AN3106A-22-14S	MIL C-5015
S-1001	R5930–093–8130–D334	SWITCH: electromagnetic; coil, 26.5 v; 1⅝" dia x 1¾" long excluding shaft; shaft .250" dia x 27/32" long.	Positions power switch	04777	269 1349 00
S-1002	R5930–239–3336–D334	SWITCH: 1 circuit, 12 position; non-shorting type; rotary; 1⅞" x 1⅝" x 1/16".	CHANNEL selector	13499	505 4861 002
XI-1001	R17-L-11793-6000	LIGHT, Indicator: includes lock washer and hex mounting nut.	Mounts I-1001	83564 Cat. 1617C	262 0237 00
XI-1002	R17-L-11793-6000	LIGHT, Indicator: includes lock washer and hex mounting nut.	Mounts I-1001	83564 Cat. 1617C	262 0237 00

* Contract N5sa-8648
** Contract N0a(s)-51-103f
ϕ Contract N0a(s)-52-961
† Contract N0a(s)-9216
*** Contract N0a(s)-51-244a
θ Contract N0a(s)-52-1027
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
° Contract N0a(s)-51-259
°° Contract N0a(s)-53-983

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SET AN/ARR-15 — **MAJOR ASSEMBLY: RADIO SET CONTROL C-733A/ARR-15A**

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	MFR. and DESIG. or AWS TYPE	CONT. or GOVT. DWG. or SPEC. No.
1100–1199 series φ θ °°	R-16-AN-C733A/ ARR-15A	CONTROL, Receiver: C733A/ARR-15A; remote control for switching receiver to any one of 10 preset frequency channels; turns set on and off and removes control of receiver from local control or other remote units; adjust sensitivity of receiver; used with Radio Receiver AN/ARR-15A: aluminum case, black front panel, edge lighting of controls; approx weight 1.7 lb without plug; 5¾″ wide x 2¼″ high x 5-11/32″ deep without connector.	Remote control of AN/ARR-15A		506 0778 003
A–1101φ θ °°		PLATE, Mounting: aluminum; 5.750″ x 2.250″ x 3.250″; 4 Dzus fasteners.	Mounting for A–1103, A–1104 and A–1105	13499	505 7809 003
A–1102φ θ °°		COVER, Aluminum: 4.876″ x 2.126″ x 3.500″; 2 Dzus fasteners.	Dust cover	13499	505 7805 002
A–1103φ θ °°		PLATE, Aluminum: 4.5″ x 4½″ x 1¾″ x 3/16″.	Mounting plate for J–1001	13499	505 7803 002
A–1104φ θ °°	R5825–093–6046–FCRC	PANELBOARD: plastic; transparent; 5.687″ x 2.187″ x .187″.	Front panel	13499	506 1202 002
A–1105φ θ °°		PLATE, Switch mounting: aluminum; 4.3437″ x 1.844″ x .064″.	Mounting plate for S–1101 and S–1102	13499	505 7807 003
E–1101φ θ °°	R5355–284–6191–E111	KNOB: includes E-1101A and E-1101B.	SENS control knob	13499	505 7804 002
E–1101Aφ θ °°		KNOB: round, aluminum; for ¼″ dia shaft; medium straight knurl; shaft hole 9/16″ deep; ¾″ x 11/16″ includes two 6–40 NF–2 set screws.	Part of E–1101	13499	505 7801 002
E–1101Bφ θ °°		KNOB: skirt; aluminum; 13/32″ dia x .031″; .375″ dia shaft hole; punched slot 5/32″ x .031″.	Part of E–1101	13499	504 8794 00
E–1102φ θ °°	R5821–036–7307–FCRC	KNOB: includes E–1102A and E–1102B.	Power switch knob	13499	504 9149 002
E–1102Aφ θ °°		KNOB: hex head; aluminum; for ¼″ dia shaft; 11/16″ x 11/16″; shaft hole 17/32″ deep; includes two 6–40 NF–2 set screws.	Part of E–1102	13499	504 8804 002

* Contract N5sa-8648
** Contract N0a(s)-51-103f
φ Contract N0a(s)-52-961
† Contract N0a(s)-9216
*** Contract N0a(s)-51-244a
θ Contract N0a(s)-52-1027
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
° Contract N0a(s)-51-259
°° Contract N0a(s)-53-983

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SET AN/ARR-15

MAJOR ASSEMBLY: RADIO SET CONTROL C-733A/ARR-15A

Reference Symbol	Army Stock Number Navy Stock Number	NAME OF PART and DESCRIPTION	FUNCTION	MFR. and DESIG. or AWS TYPE	CONT. or GOVT. DWG. or SPEC. No.
E-1102Bϕ θ °°		KNOB: same as E-1101B.	Part of E-1102	13499	504 8794 00
I-1101ϕ θ °°		LAMP, Incandescent: 28v; .04 amp; red; miniature flange base.	Panel illumination	AN 3140-327	Air Force Navy Aeronautical Drawing AN 3140
I-1102ϕ θ °°		LAMP, Incandescent: same as I-1101.	Panel illumination		
I-1103ϕ θ °°	R5820-036-7371-FCRC	DIAL: consists of plate and knob; black plexiglas 1½" dia x .703"; shaft hole ¼" dia x ½" deep; tapped for two 6-40 NF-2 set screws.	Channel indicator	13499	505 3679 002
J-1101	R17-R-1726-130	CONNECTOR, Receptacle; 19 round male contacts; 1⅝" x 1⅝" x 1¾" overall.	Main cable connector	AN 3102A 22-14P	MIL-C-5015
O-1101ϕ θ °°	R5825-093-6044-FCRC	CAM, Locking: consists of cam and pin; stainless steel; 9/16" x ⅞" dia overall; drilled for ¼" shaft; tapped for two 6-40 NF-2 set screws.	Used with S-1101	13499	505 7795 001
O-1102ϕ θ °°	R5820-093-6043-FCRC	SHAFT: stainless steel; 1-1/16" x 1.206" overall.	Operates O-1101 on power switch	13499	505 7793 001
O-1103ϕ θ °°		SPRING, Detent: stainless steel; .175" dia x .545" long; wire dia. .023"; 10 coils; shock load, snap release; operates between .700" and .843" length; 1.5 lb load at .700" length.	Connects O-1101 and O-1102 to operate snap release of S-1101	13499	504 6822 002
R-1101ϕ θ °°	R16-R87192-1278N	RESISTOR, Variable: insulated composition; 500 ohms; ±20%; 1W, 70°C max continuous operation; 3 solder lug terminals; molded phenolic case 31/32" dia x 19/32"; round metal shaft ¼" dia x 11/16" long from mtg surface; insulated contact arm; normal torque; bushing ⅜"-32 x ¼" lg; non-turn device located on 17/32 radius at 9 o'clock.	SENS control		380 0788 00
S-1101ϕ θ °°	R5820-093-6014-FCRC	SWITCH: consists of manual operate and manual or remote release section and 2-position, single-deck; band switch section; coil, 26.5v; 1⅝" dia x 1¾" long excluding shaft; shaft .250" dia x 23/32" long.	Power switch	04777	269 1373 00

S-1102φ θ °°	R5930-259-8283-D334	SWITCH, Rotary: 1 pole, 10 position; 1 section; spring silver celloy contact; phenolic body; 7/8" lg x 1¼" wd x 1-5/16" h; non-shorting type contact, solder lug terminal; single hole mtg; bushing 3/8"-32 x 3/8" lg; shaft 1¾" lg x ¼" dia; 30 dia indexing w/stops limiting rotation to 10 position.	Channel selector	13499	259 0520 00
XI-1101	R17-L-11793-6000	LIGHT, Indicator: consists of cap, shell, lock washer, and hex mounting nut.	Mounts I-1101	83564 Cat. 1617C	262 0237 00
XI-1102φ θ °°	R6250-370-3961-D336	CAP: consists of cap rubber seal washer and red filter; ½" dia x 43/64"; free end of filter threaded 3/8-24 NF-2.	Part of XI-1101	83564	262 0233 00
XI-1103	R17-L-11793-6000	LIGHT, Indicator: same as XI-1101.	Mounts I-1102	Cat. 1617C	262 0237 00
XI-1104φ θ °°	R6250-370-3961-D336	CAP: same as XI-1102.	Part of XI-1103	83564	262 0233 00

* Contract N5sa-8648
** Contract N0a(s)-51-103f
φ Contract N0a(s)-52-961
† Contract N0a(s)-9216
*** Contract N0a(s)-51-244a
θ Contract N0a(s)-52-1027
†† Contract N0a(s)-9972
††† Contract N0a(s)-10901
° Contract N0a(s)-51-259
°° Contract N0a(s)-53-983

SECTION VIII

DRAWINGS

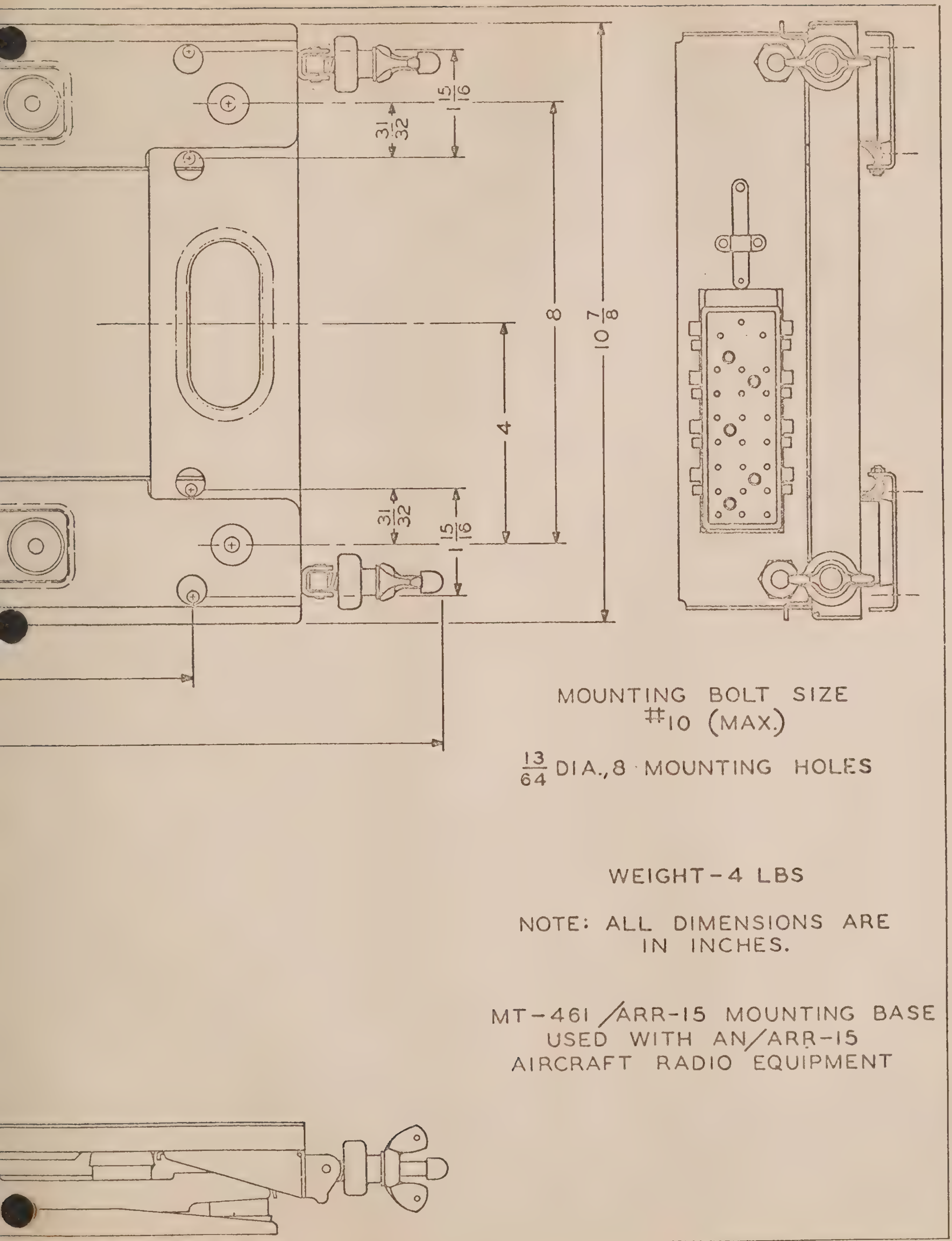
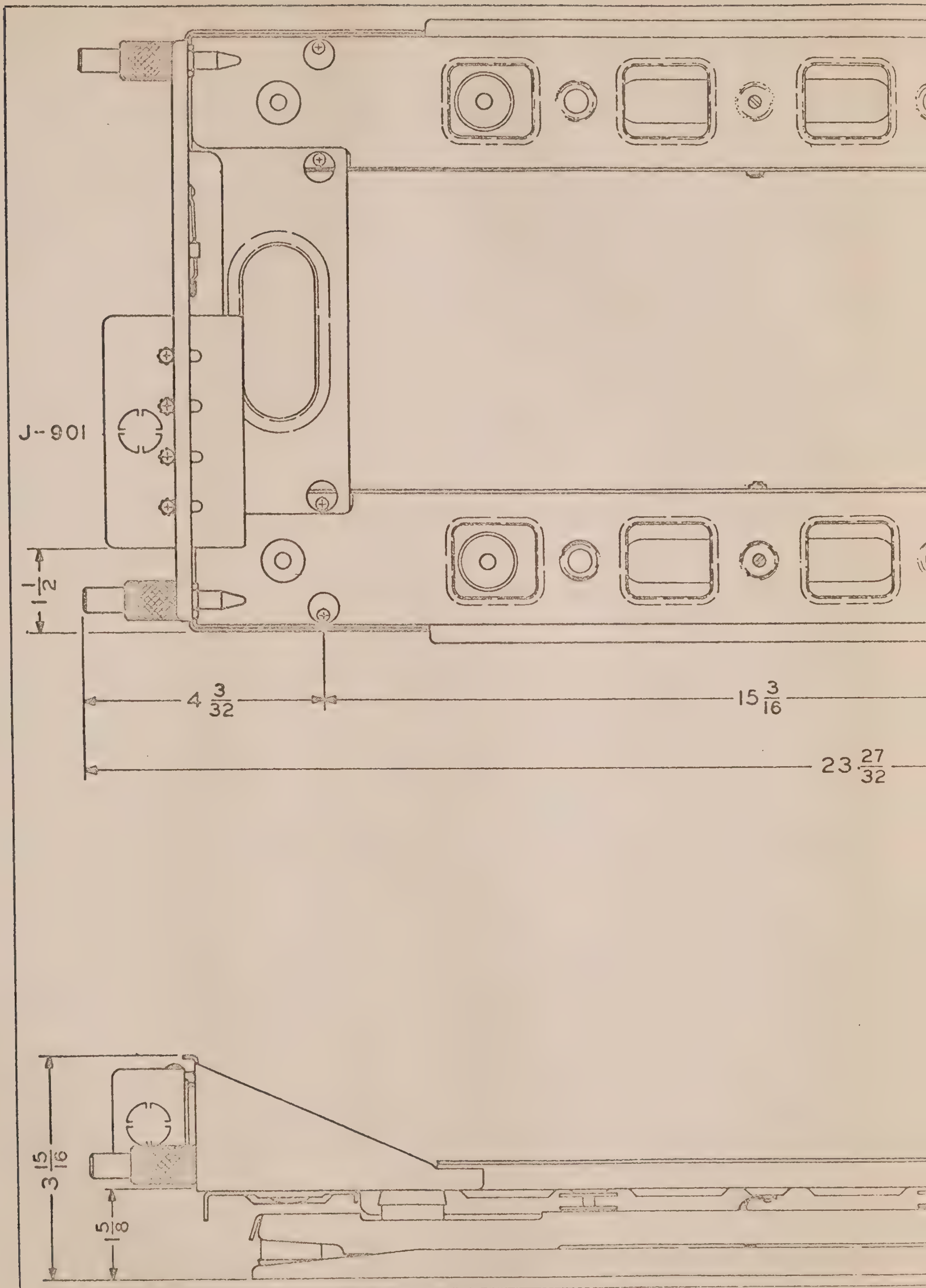


Figure 8-1. Mounting Base Dimensions


J-901
1 1/2
4 3/32
15 3/16
23 27/32
3 15/16
1 5/8

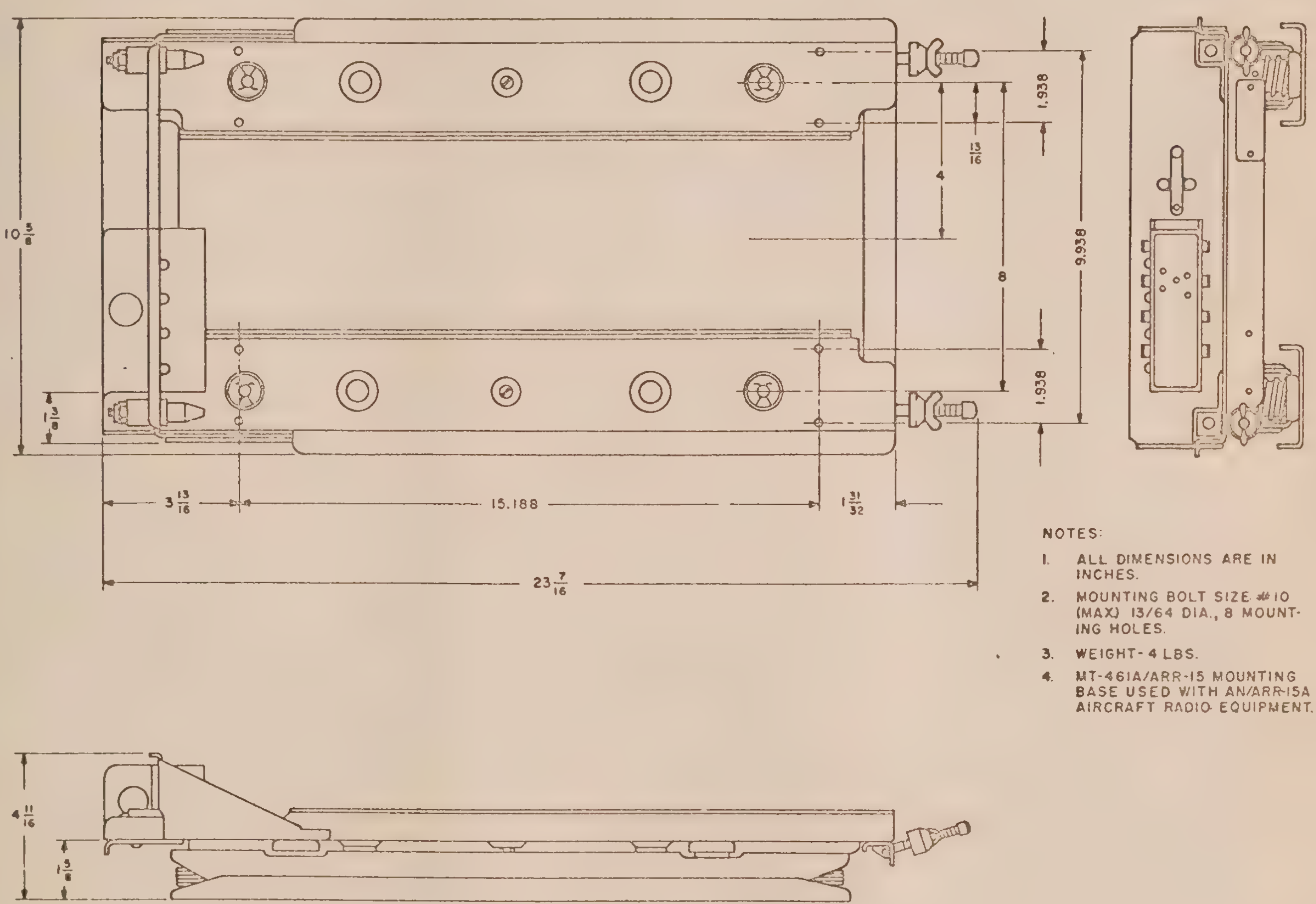


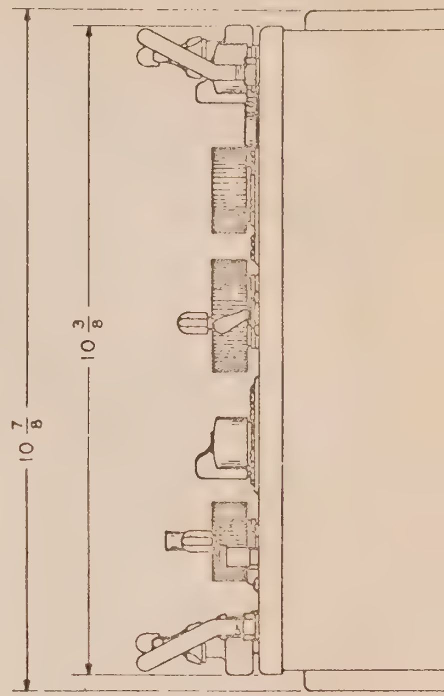
Figure 8-1A. Mounting Base Dimensions, Radio Set Control C-733A/ARR-15A

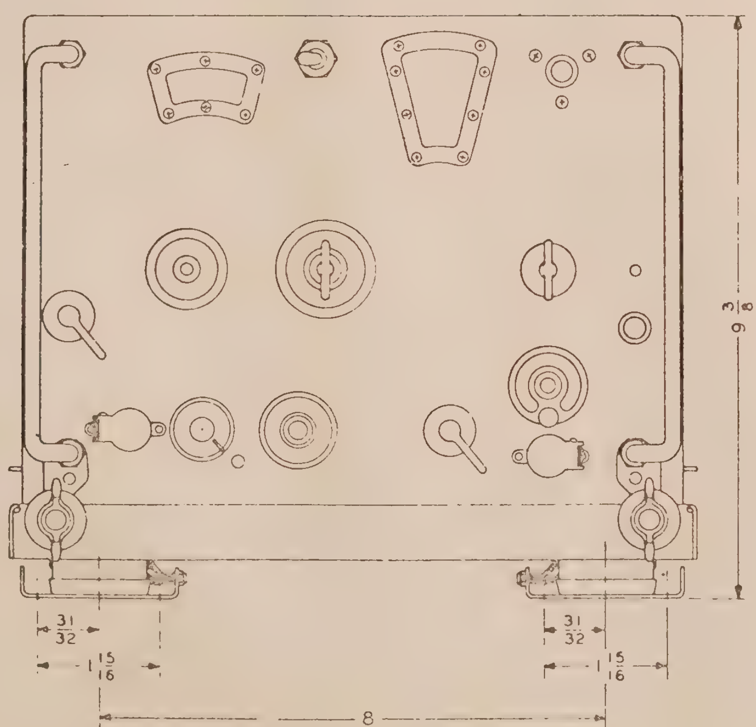
NOTE: ALL DIMENSIONS ARE IN INCHES:

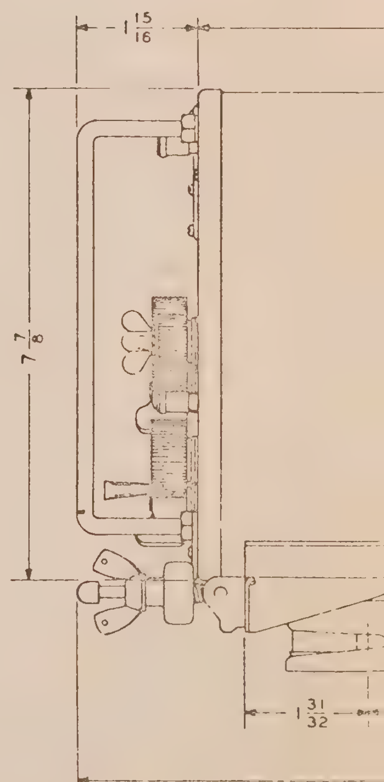
CLEARANCES

FRONT OF UNIT
- 4" FOR REMOVAL OF UNIT
- 18" FOR ADJUSTING CONTROLS

REAR OF UNIT
- 3" FOR REMOVAL OF CONNECTOR PLUG FROM SHOCKMOUNT AND VENTILATION
- 4" IF CABLE COMES DIRECTLY FROM REAR OF CONNECTOR PLUG
- $\frac{1}{2}$" FOR FREE MOVEMENT IN ANY DIRECTION ON SHOCKMOUNT







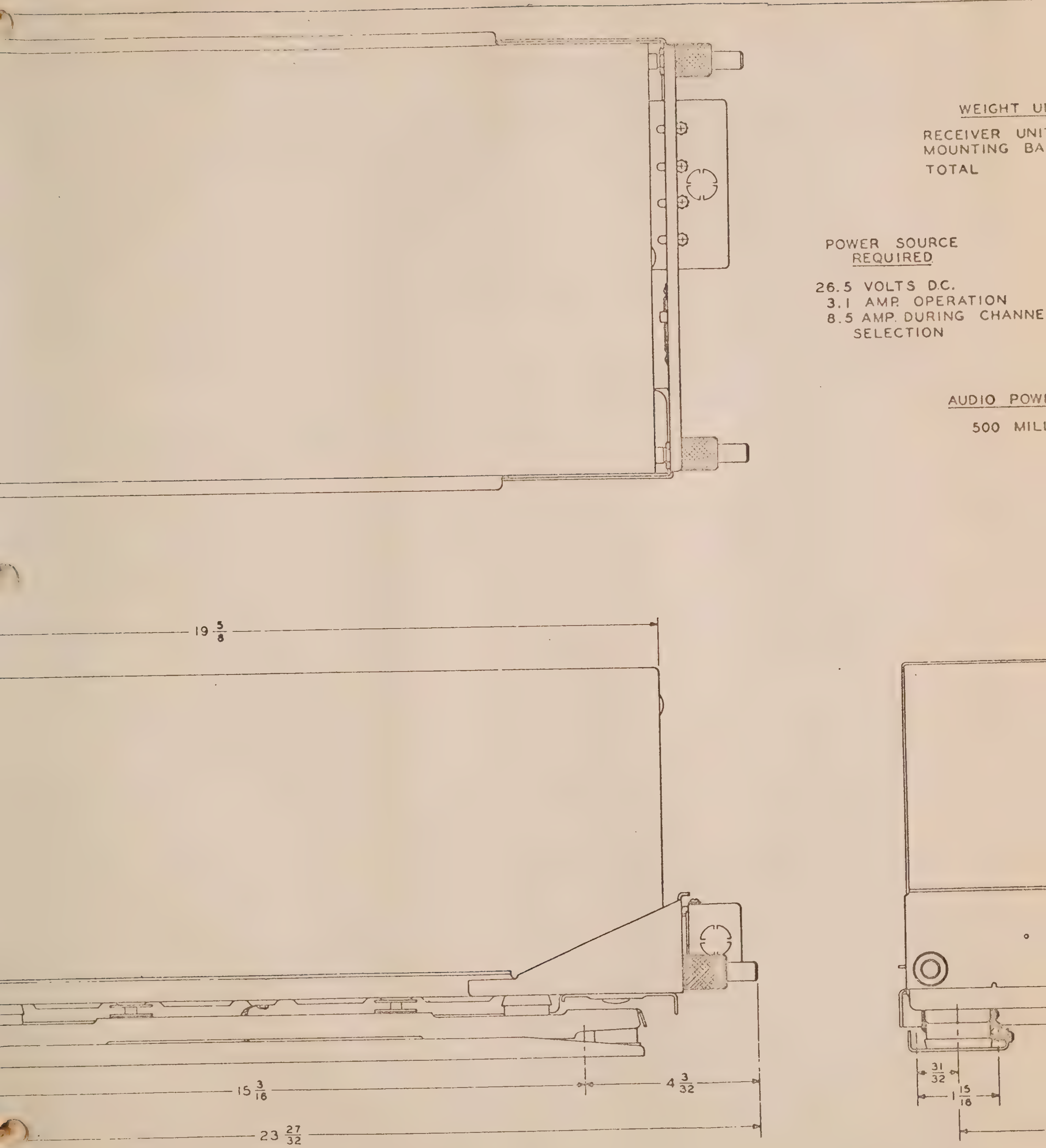


Figure 8-2. Receiver Outli

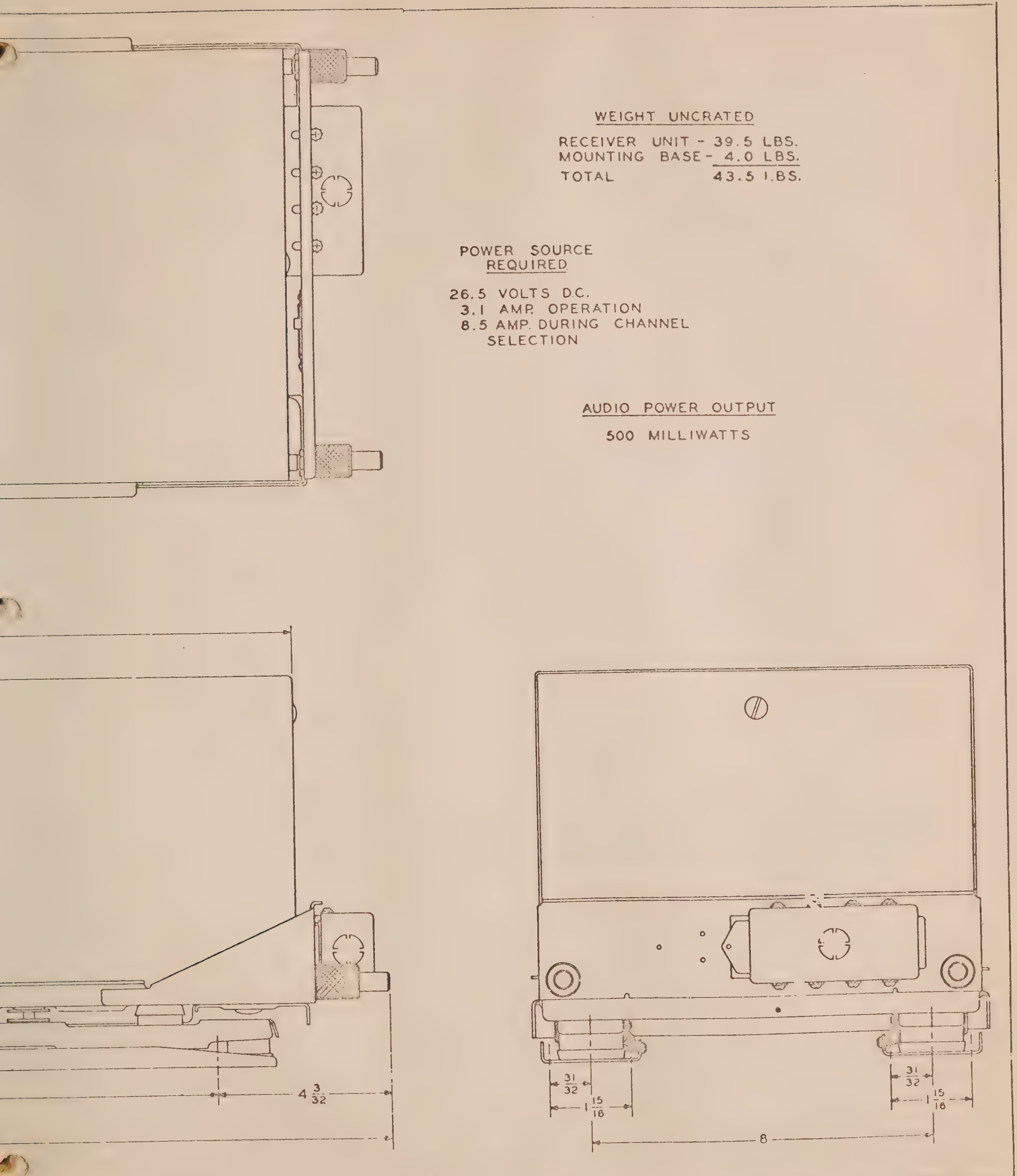


Figure 8-2. Receiver Outline and Mounting Dimensions

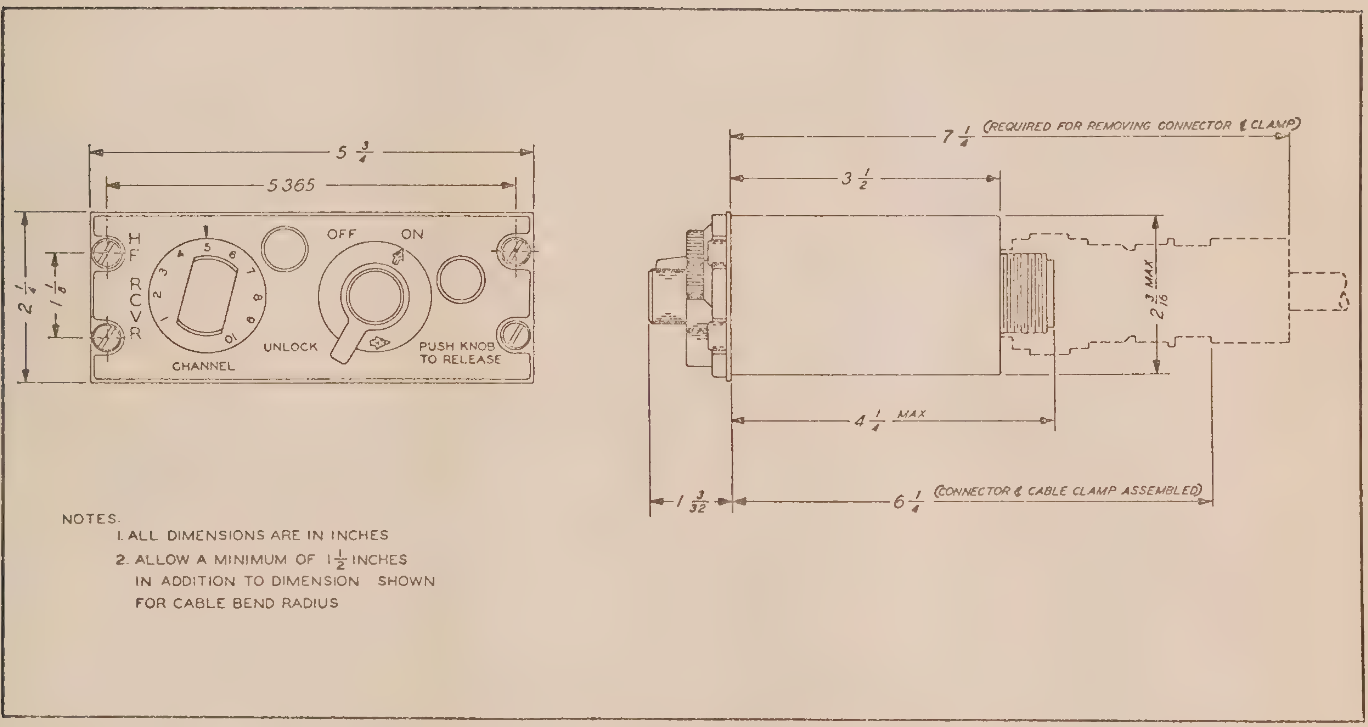
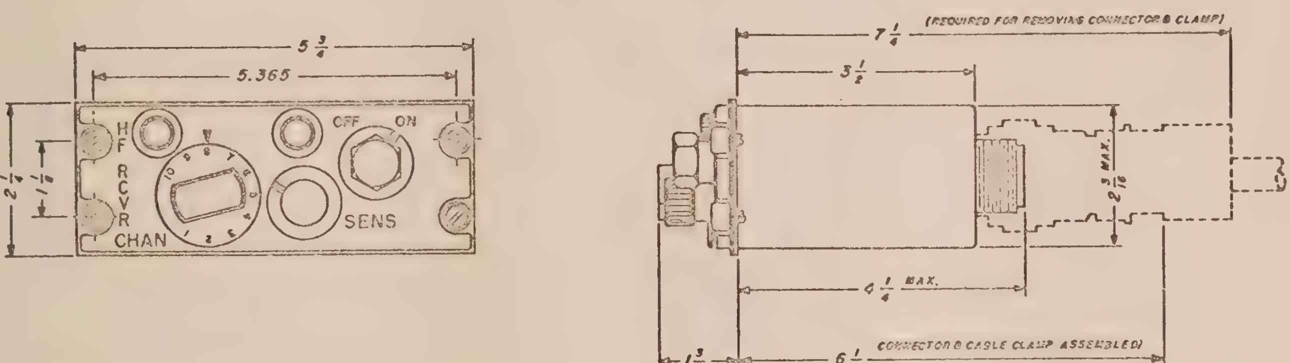


Figure 8-2A. Radio Set Control C-733/ARR-15A, Outline and Mounting Dimensions



NOTES:
1. ALL DIMENSIONS ARE IN INCHES
2. ALLOW A MINIMUM OF 1 1/2 INCHES IN ADDITION TO DIMENSION SHOWN FOR CABLE BEND RADIUS

Figure 8-2B. Radio Set Control C-733A/ARR-15A, Outline and Mounting Dimensions

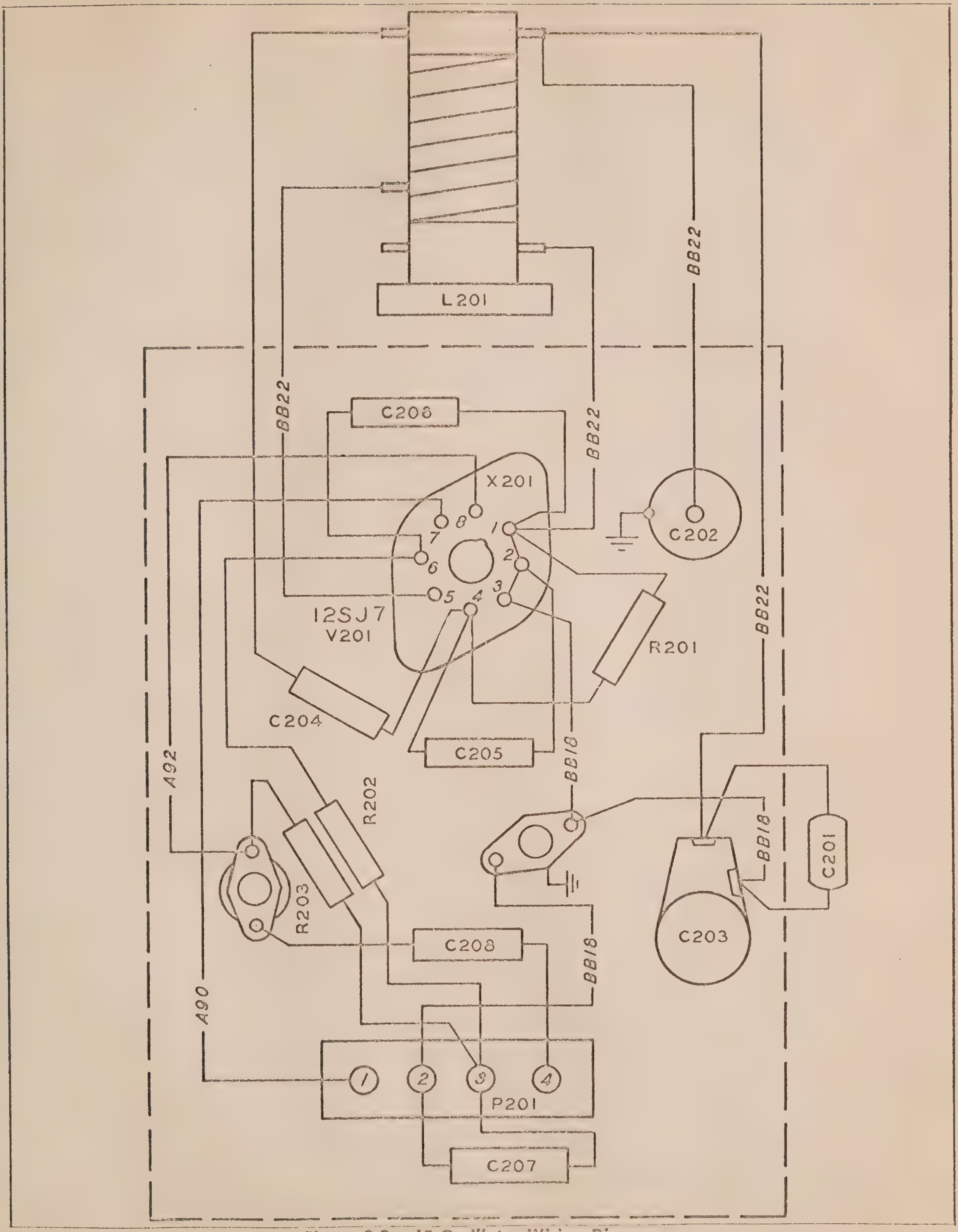


Figure 8-3. LF Oscillator Wiring Diagram

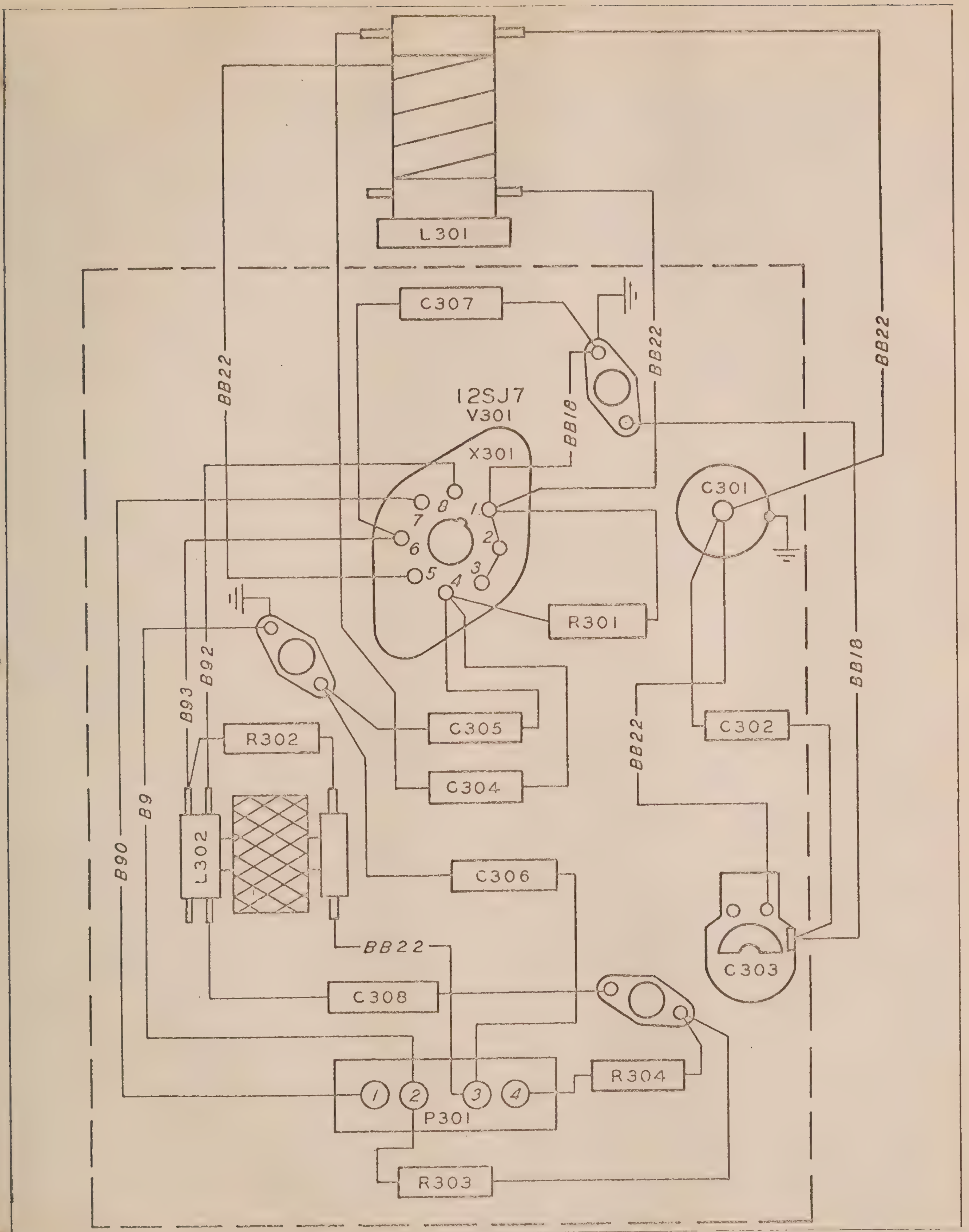


Figure 8-4. HF Oscillator Wiring Diagram

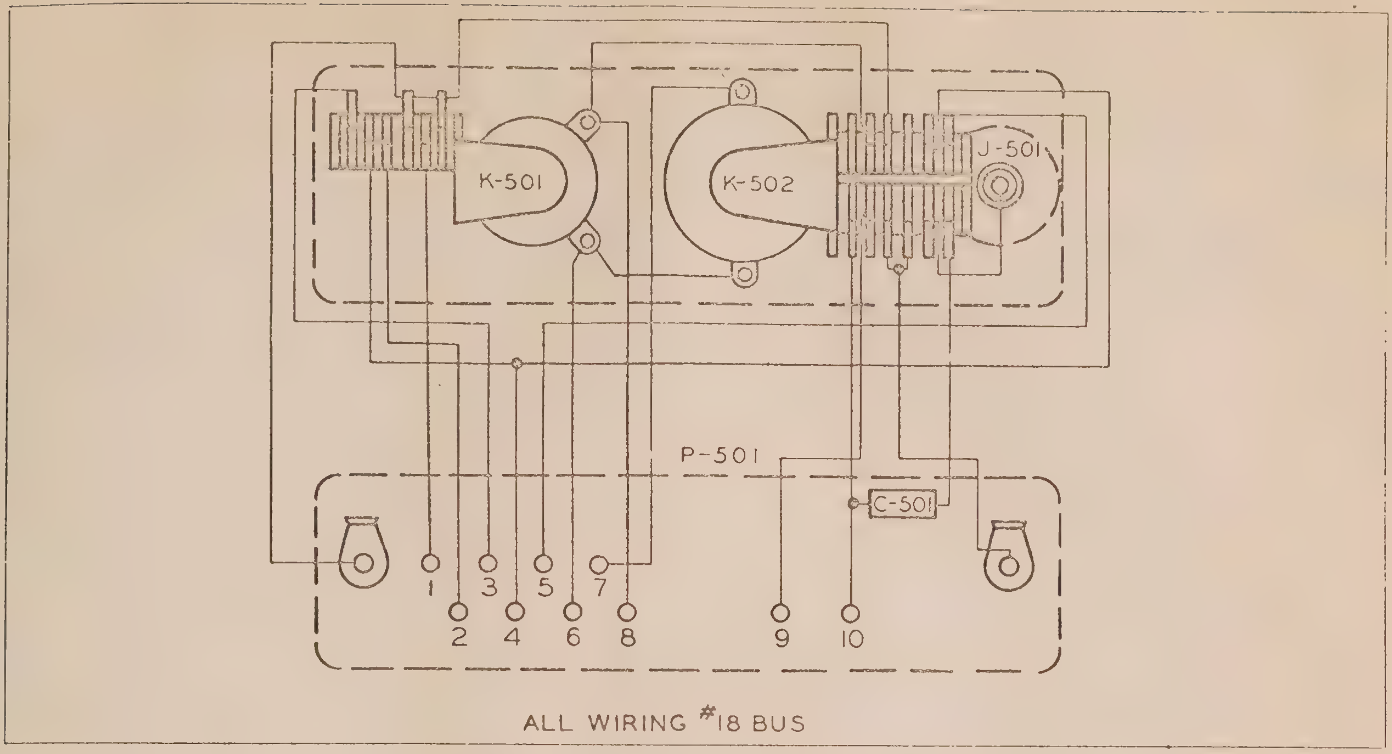


Figure 8-5. Relay Unit Wiring Diagram

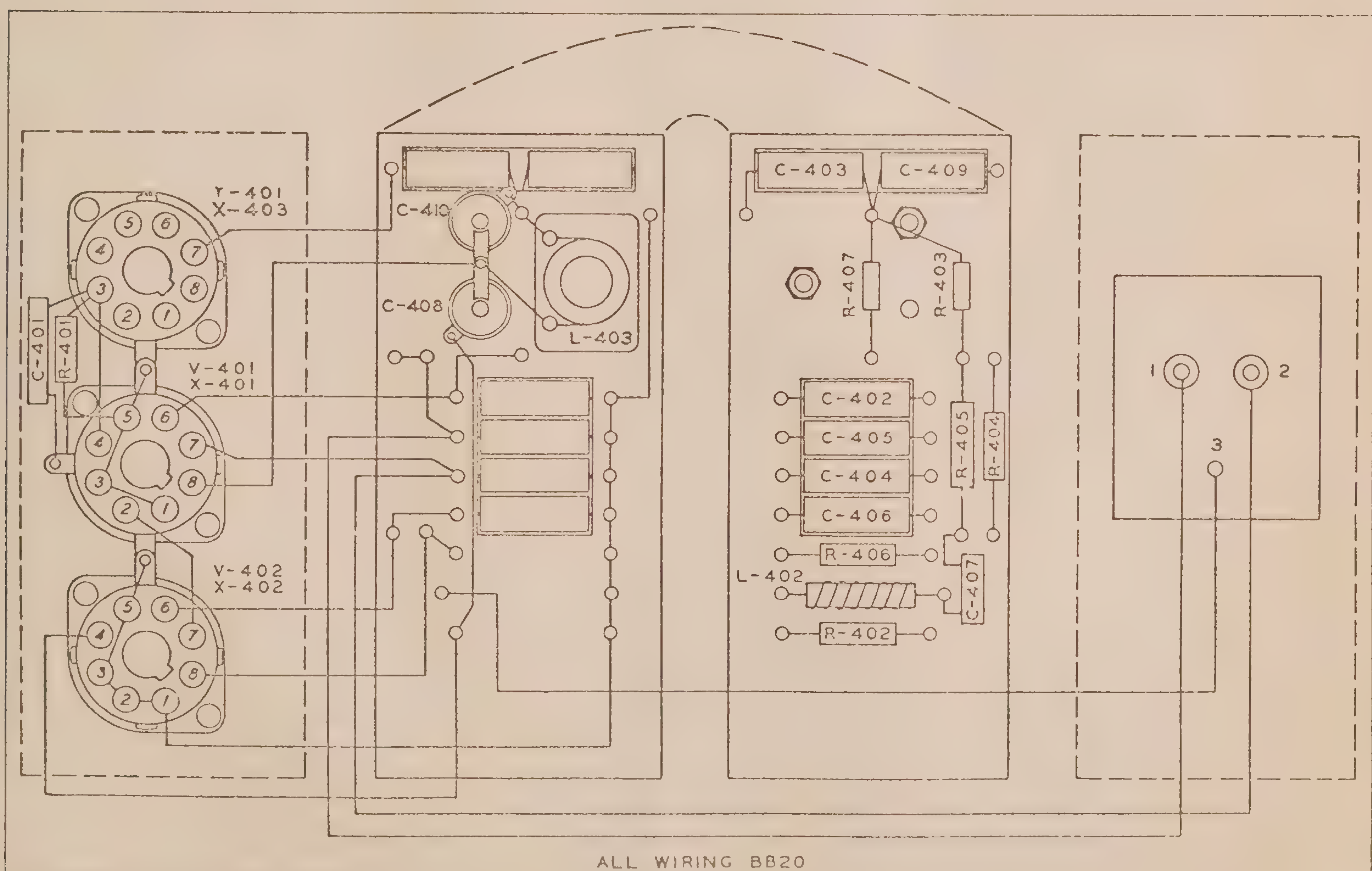


Figure 8-6. CFI Unit Wiring Diagram

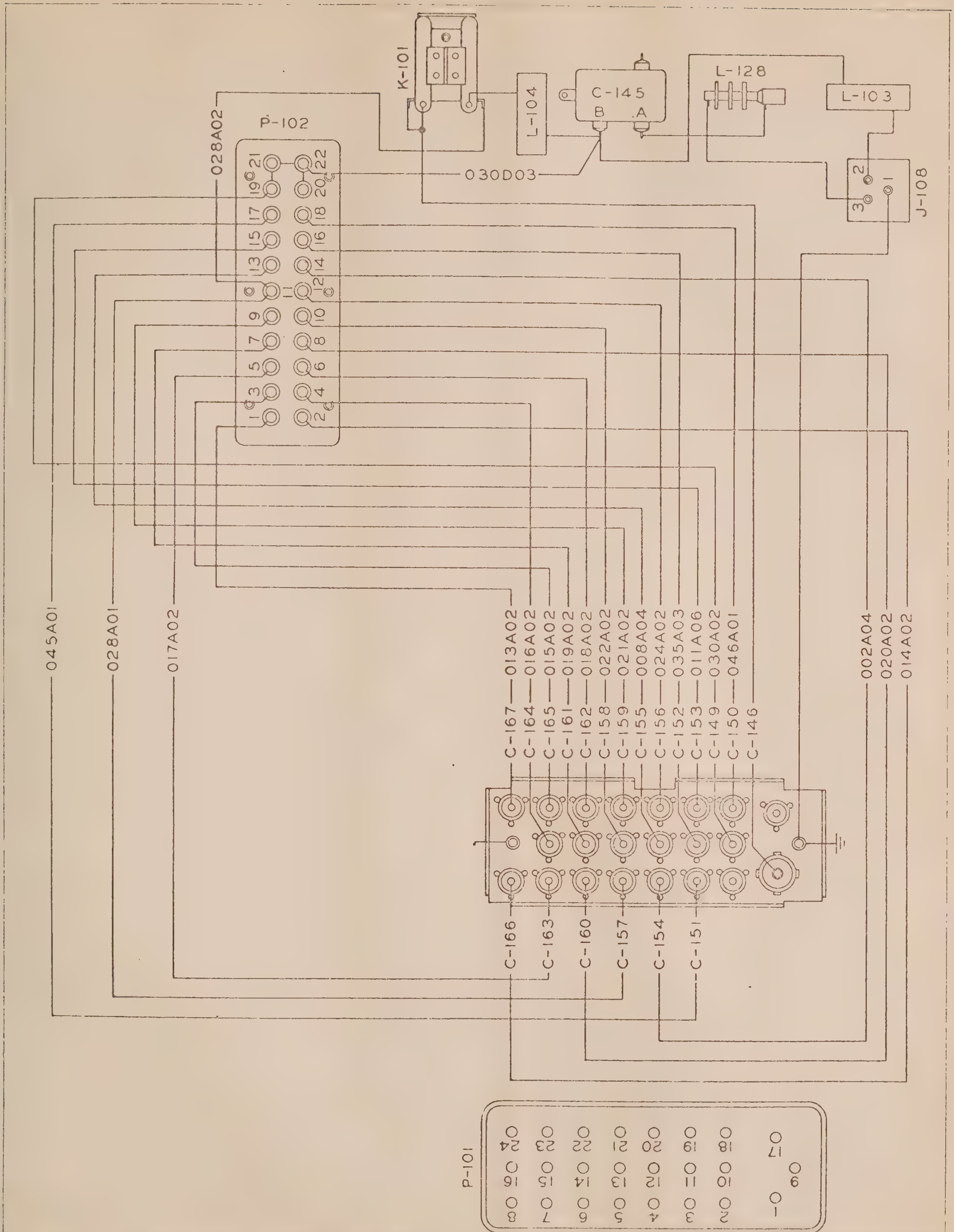


Figure 8-7. Filter Unit Wiring Diagram

40
50

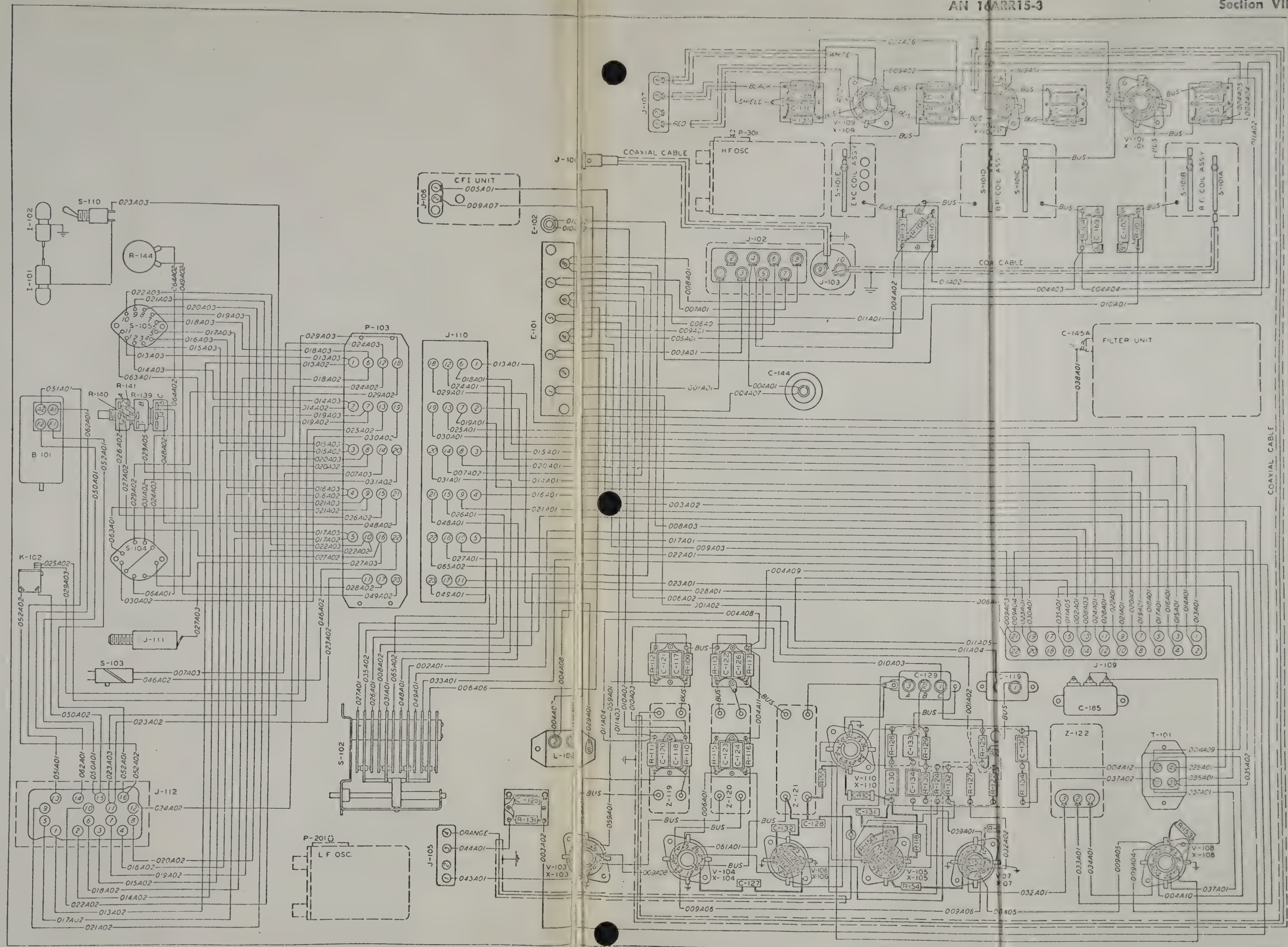
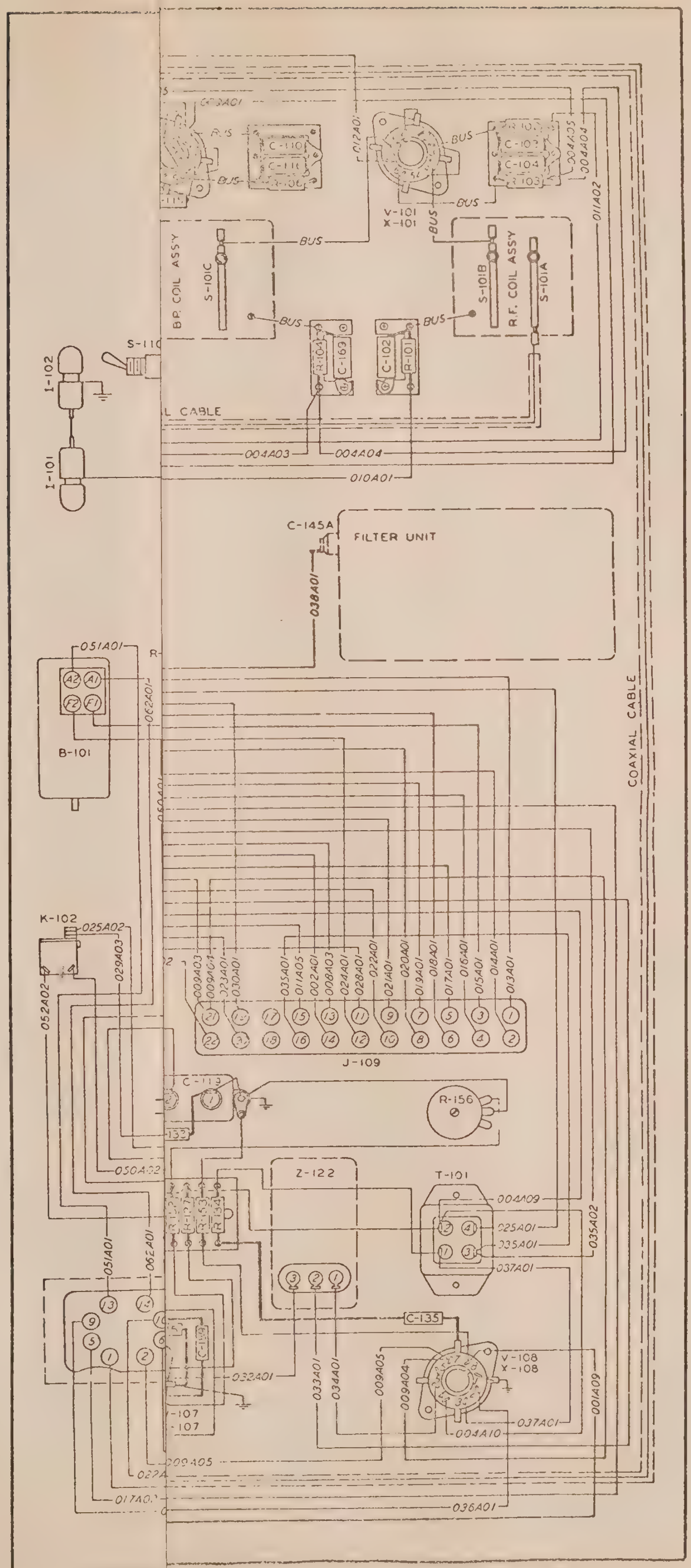


Figure 8-8. Receiver Practical Wiring Diagram

-3



Practical Wiring Diagram

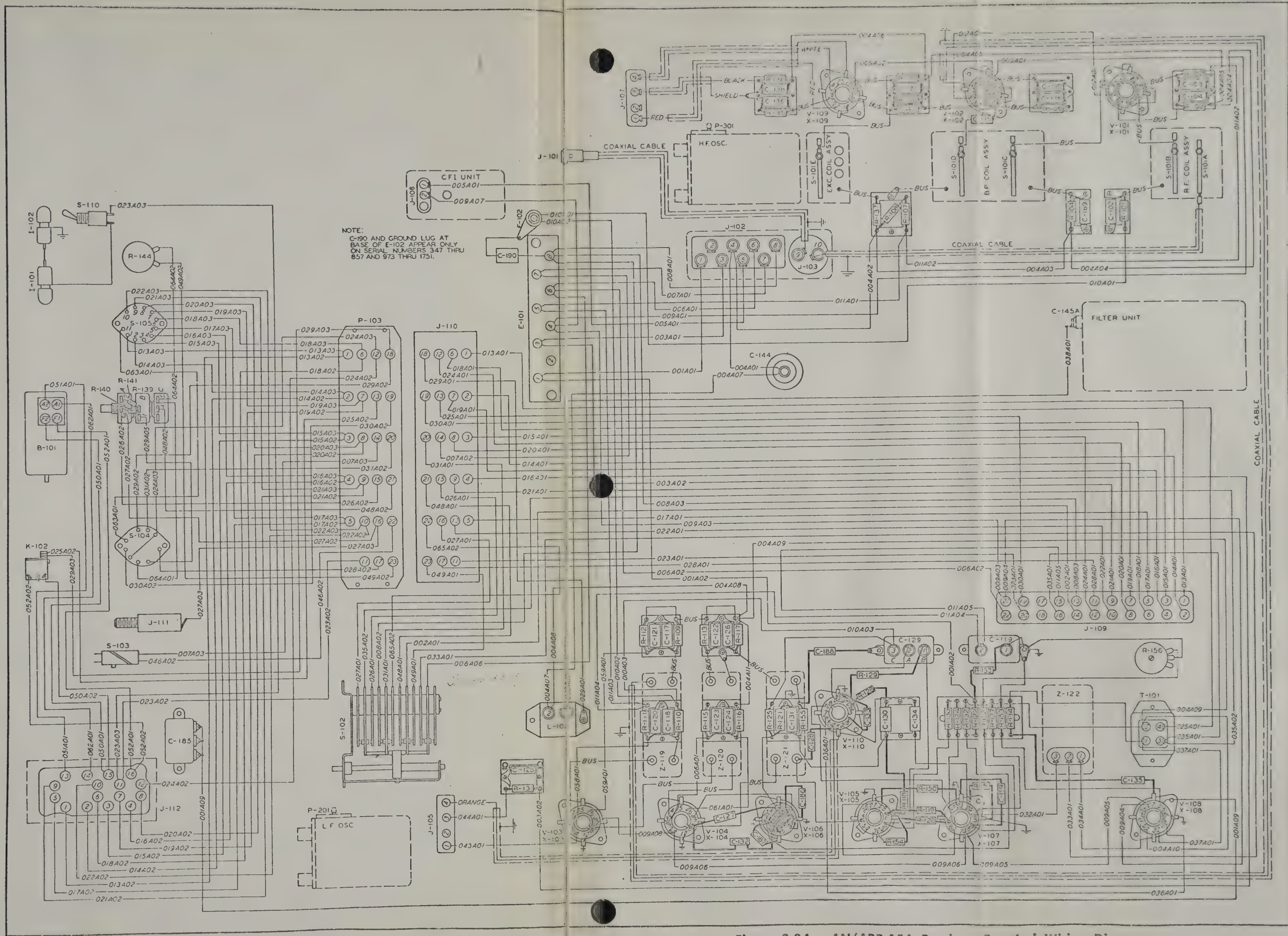
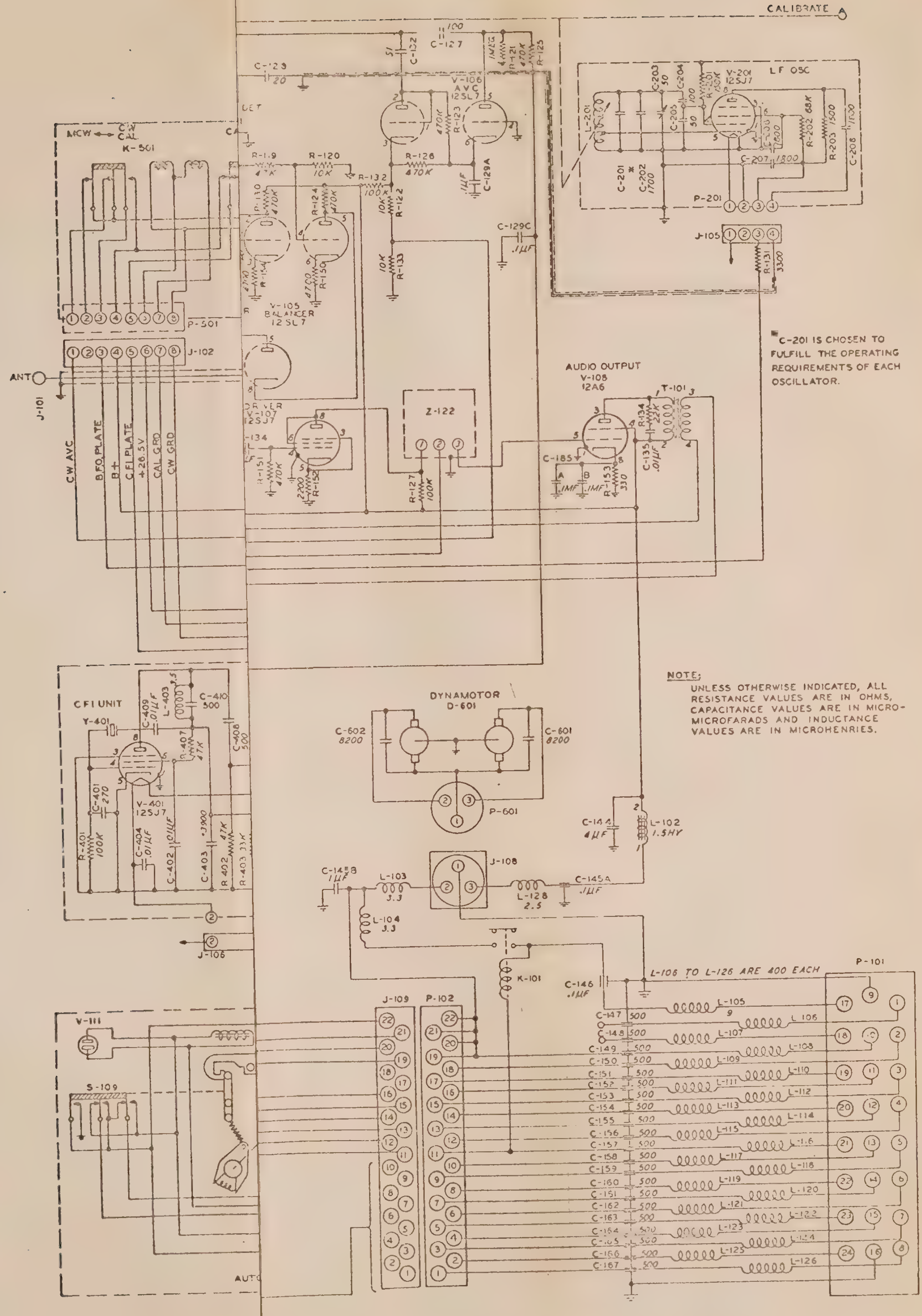


Figure 8-8A. AN/ARR-15A Receiver, Practical Wiring Diagram



8-9. Receiver Complete Schematic Wiring Diagram

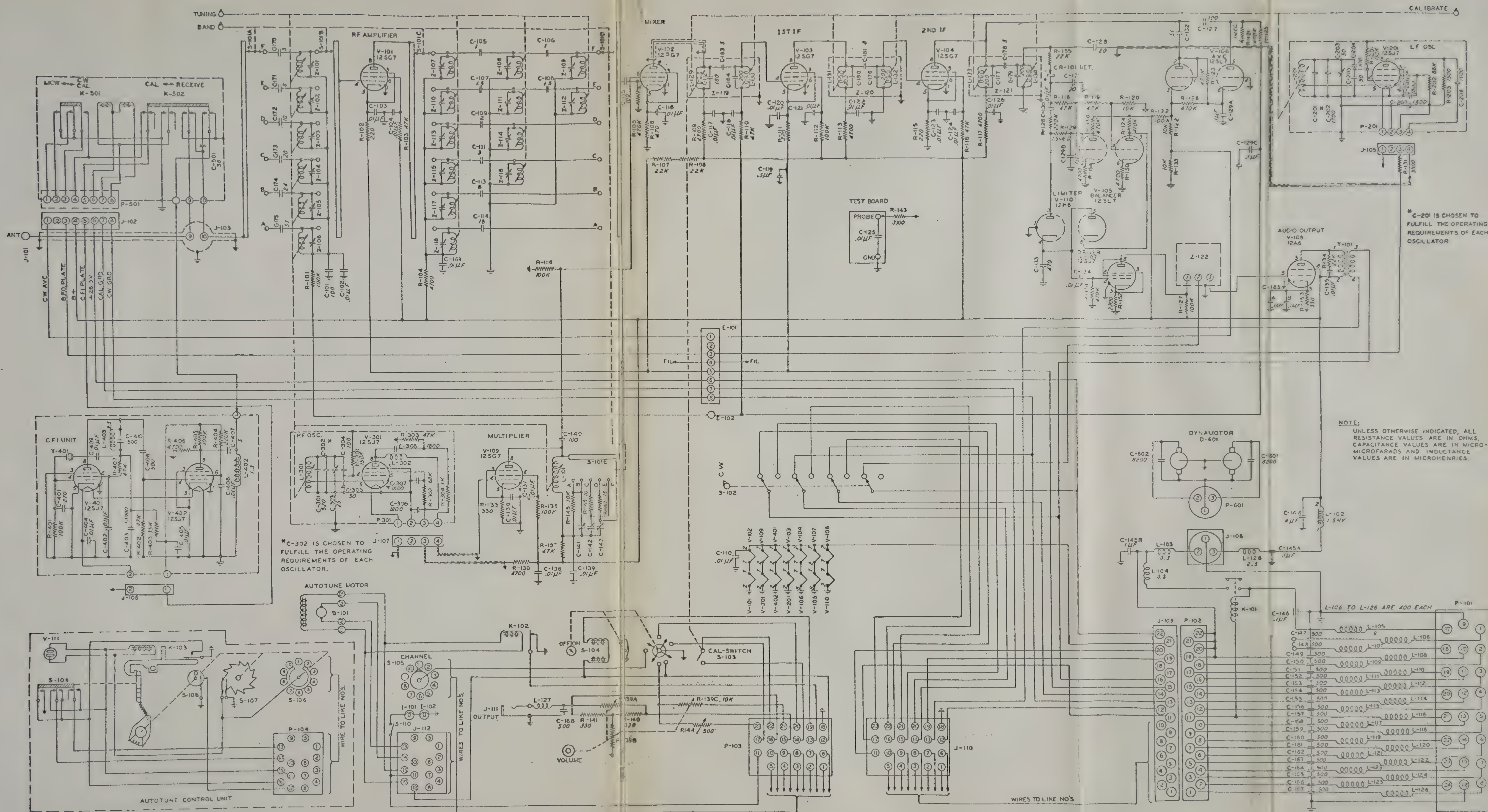
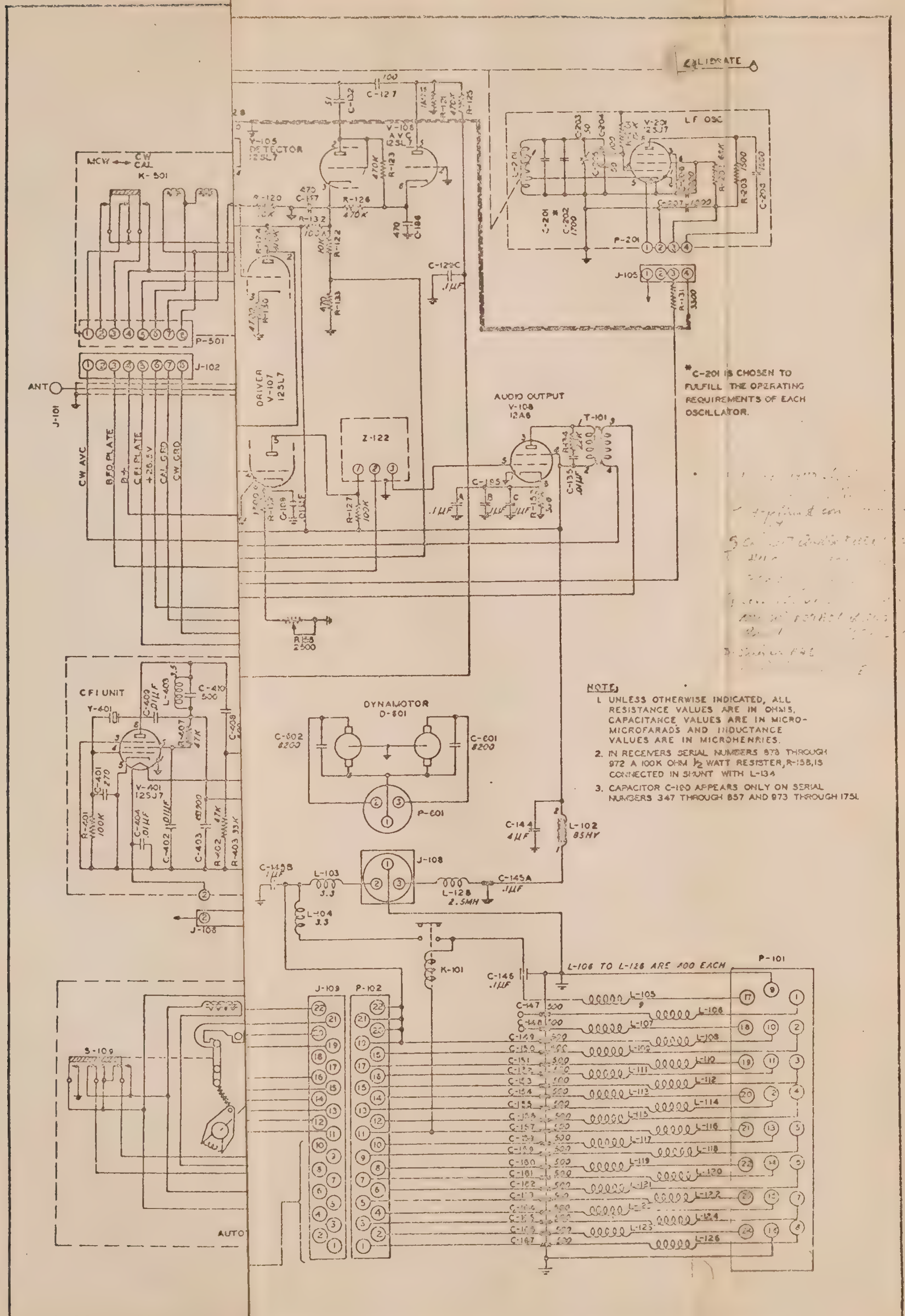


Figure 8-9. Receiver Complete Schematic Wiring Diagram



-15A Receiver Complete Schematic Wiring Diagram

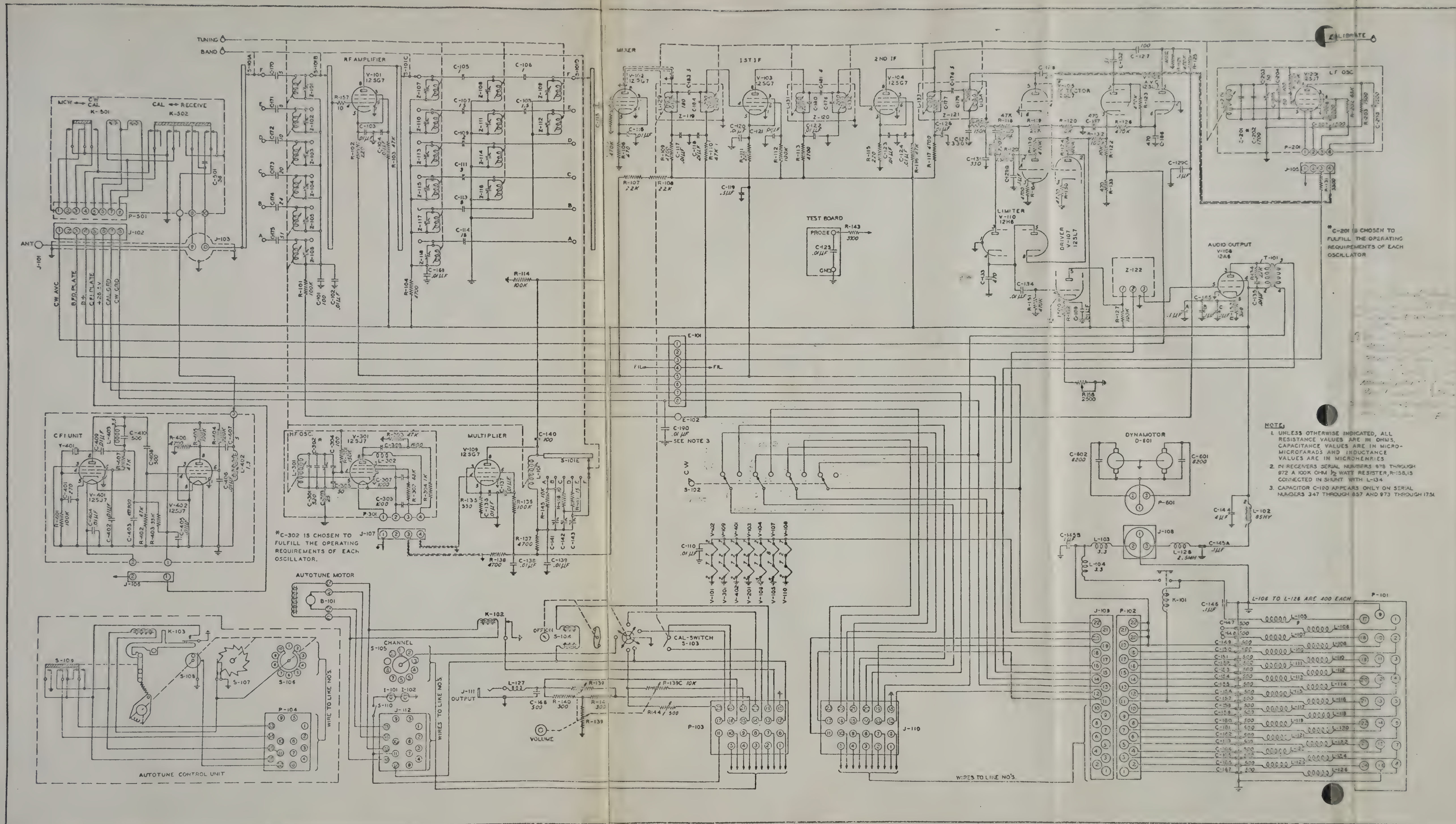
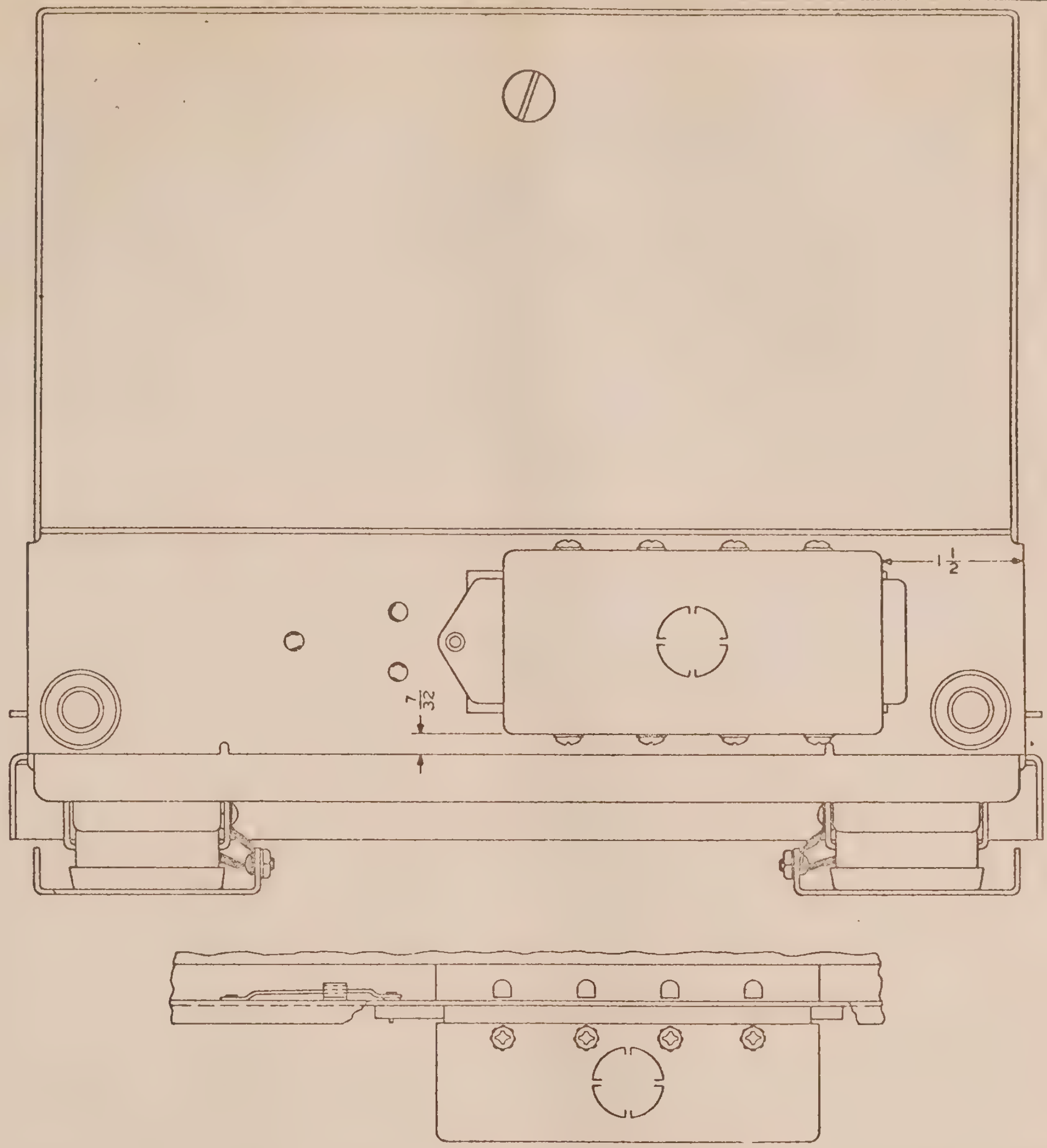
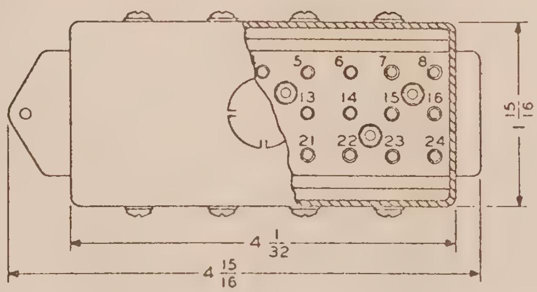


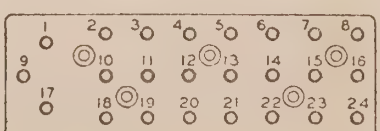
Figure 8-9A. AN/ARR-15A Receiver Complete Schematic Wiring Diagram



REAR AND TOP VIEWS ILLUSTRATING MOUNTING OF PLUG RECEPTACLE (J-901) TO MOUNTING BASE

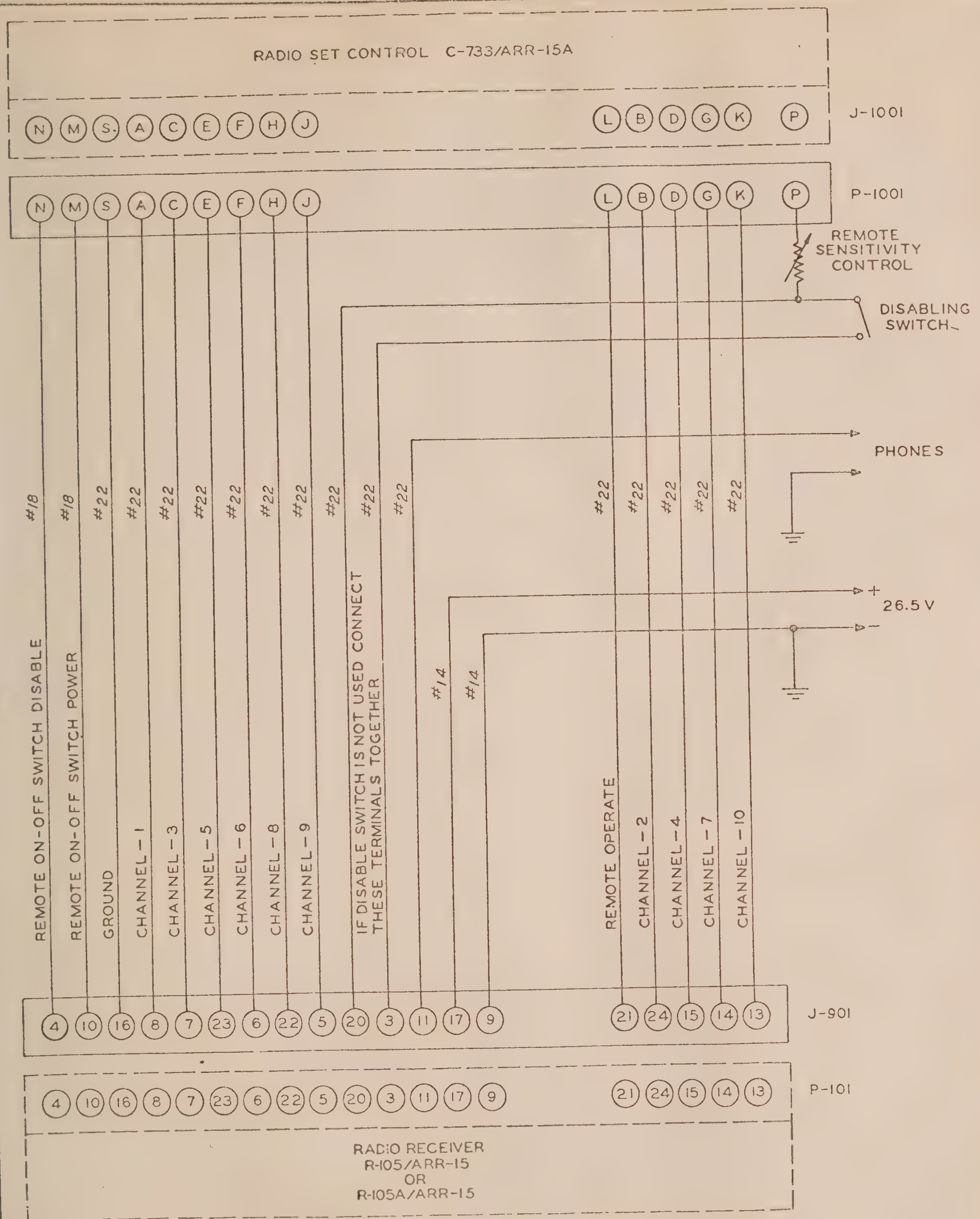


REAR VIEW OF PLUG RECEPTACLE (J-901) AND TERMINAL BOARD SHOWING POSITIONS OF TERMINALS



TERMINAL BOARD

Figure 8-10. Receiver Plug Connector Details



NOTE: SIZE OF WIRES ARE INDICATED ON LEADS. ALL OPEN WIRING SHOULD BE IN ACCORDANCE WITH THE ARMY-NAVY AERONAUTICAL SPECIFICATION AN-W-14a, "WIRING INSTALLATION OF AIRCRAFT."

Figure 8-11. External Connections to R-105/ARR-15 Receiver

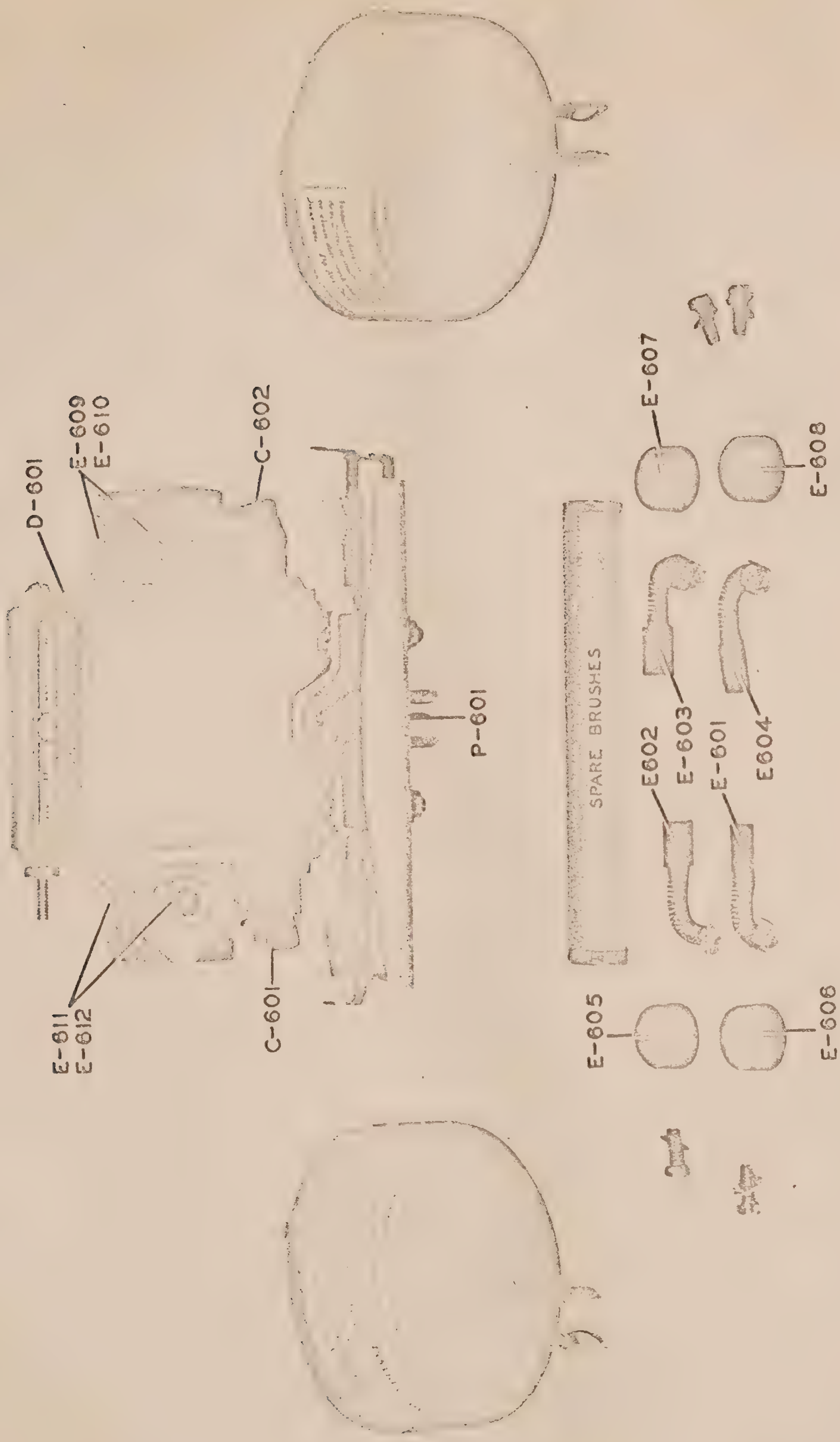


Figure 8-12. Dynamotor DY-34/ARR-15, Dismantled

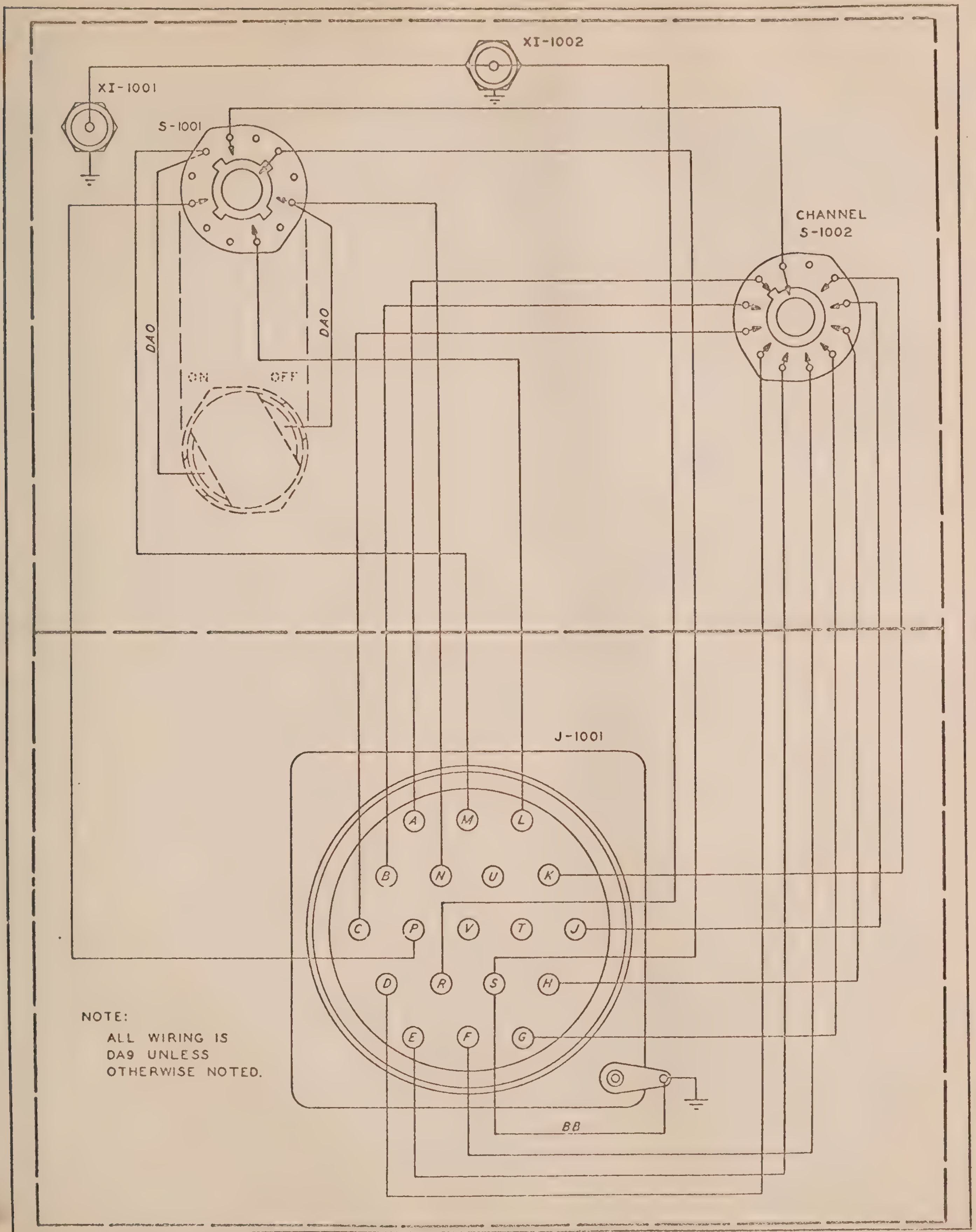


Figure 8-13. Radio Set Control C-733/ARR-15A, Practical Wiring Diagram

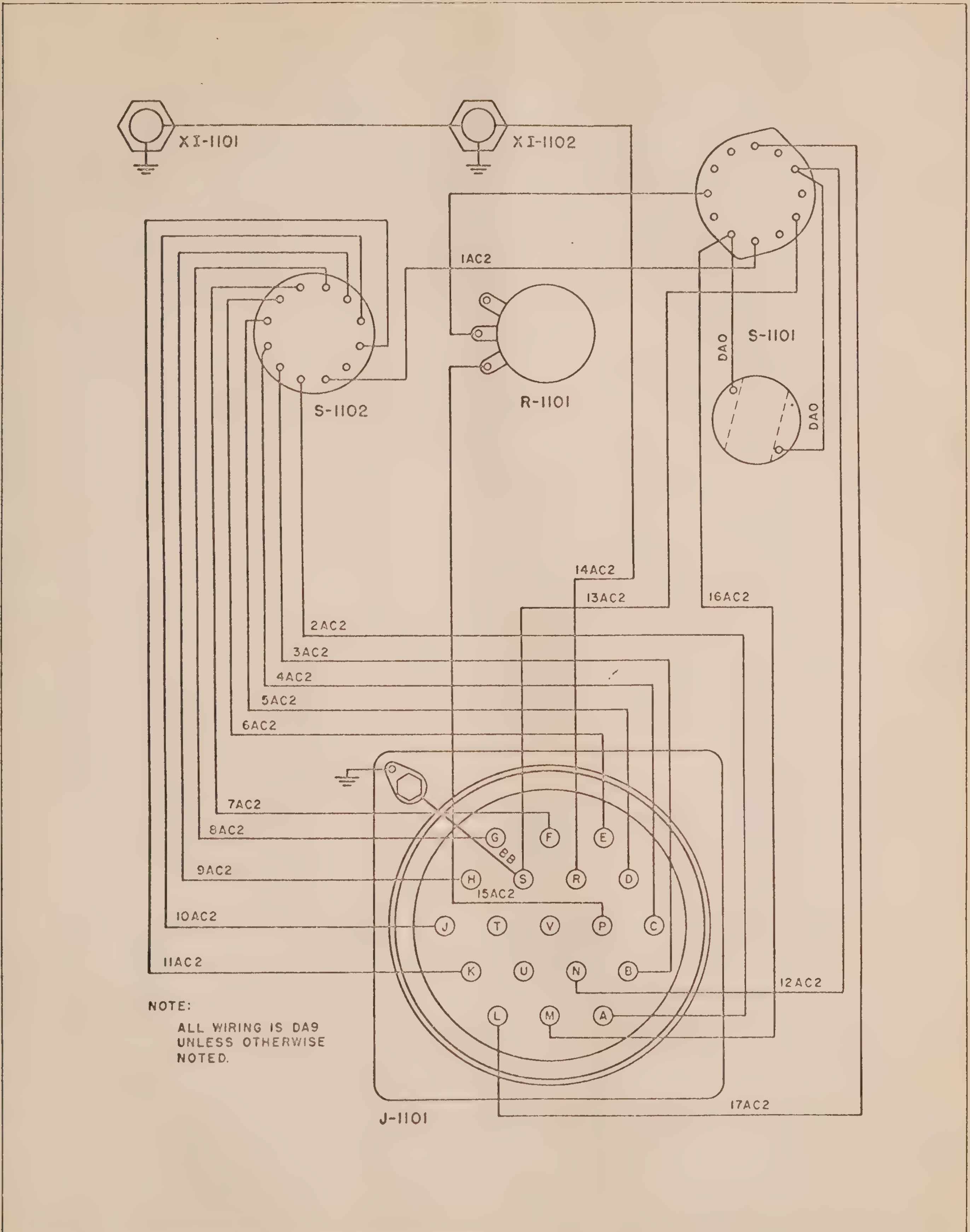


Figure 8-13A. Radio Set Control C-733A/ARR-15A, Practical Wiring Diagram

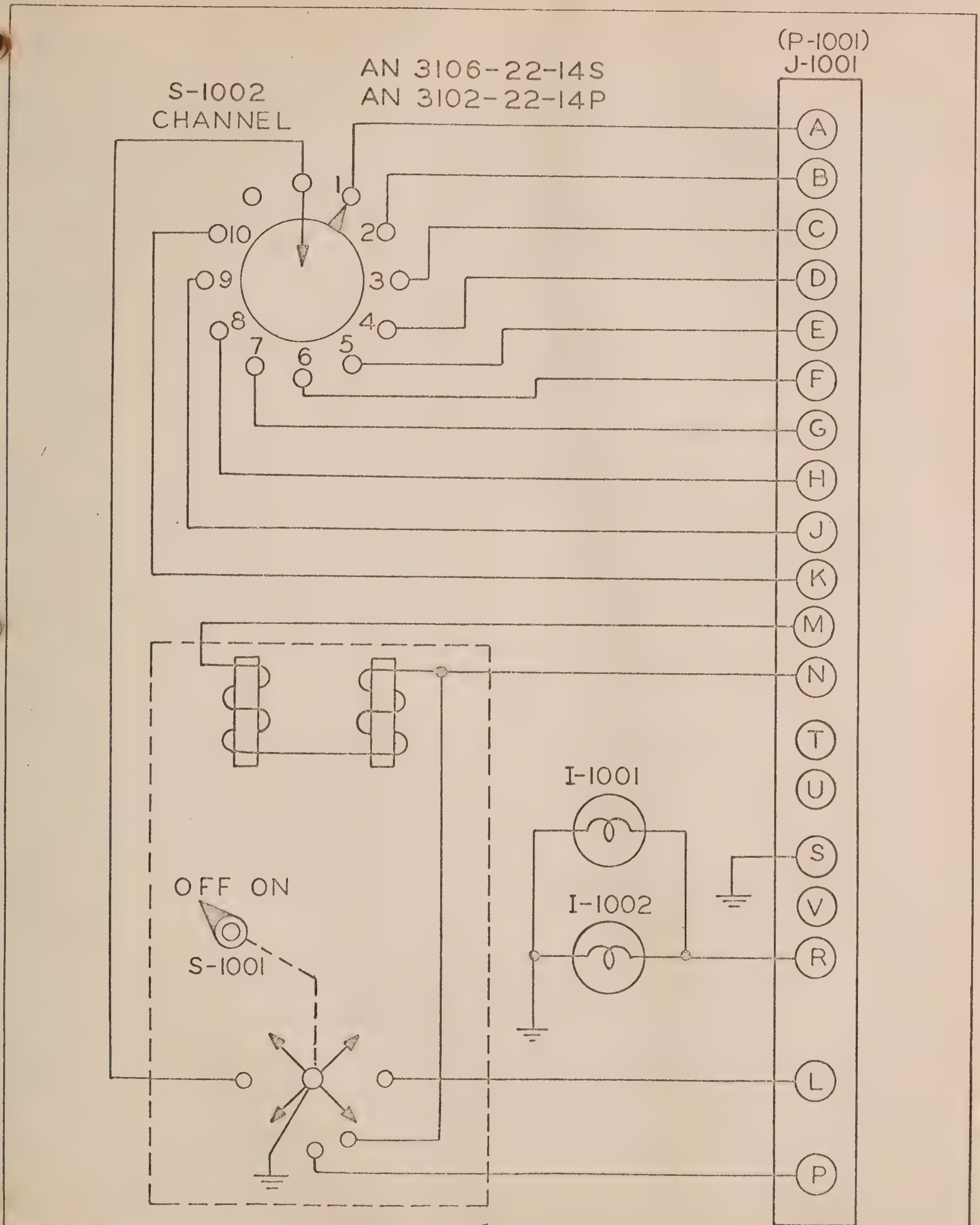


Figure 8-14. Radio Set Control C-733/ARR-15A, Schematic Wiring Diagram

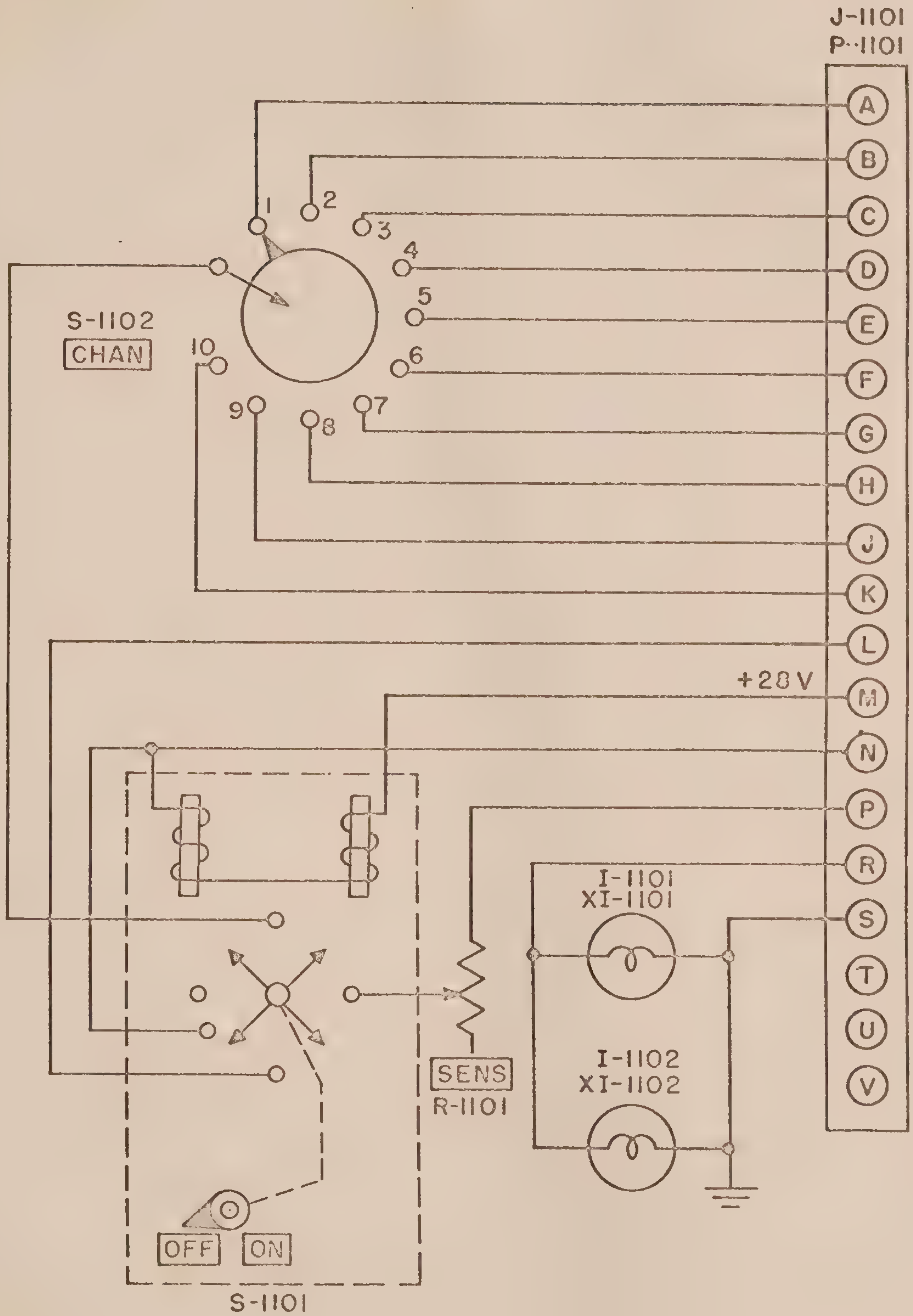


Figure 8-14A. Radio Set Control C-733/ARR-15A, Schematic Wiring Diagram

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MILITARY SPECIFICATION

RECEIVER, RADIO R-574C/ARR-39

1. SCOPE

1.1 This specification covers one type of equipment designated Receiver, Radio R-574C/ARR-39, and associated equipments.

2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issue in effect on date of invitation for bids, form a part of this specification:

SPECIFICATIONS

Military

MIL-C-3098	Crystal Units, Quartz
MIL-C-5015	Connectors, Electrical, "AN" Type
MIL-E-5272	Environmental Testing, Aeronautical and Associated Equipment, General Specification For
MIL-E-5400	Electronic Equipment, Aircraft, General Specification For
MIL-I-6181	Interference Control Requirements, Aeronautical Equipment
MIL-E-7894	Electric Power, Aircraft, Characteristics Of
MIL-C-8384	Connectors, Electrical (Molded Body) and Accessories
MIL-T-9107	Test Reports, Preparation Of
MIL-P-17555	Preparation For Delivery Of Electronic Equipment; Miscellaneous Electrical Equipment (Except Rotating Electrical Equipment) and Associated Repair Parts
MIL-T-25016	Test of Communications Equipment For Vulnerability To Jamming (This specification is CONFIDENTIAL)
MIL-T-26242	Test Of Command Control Data Link System For Vulnerability To Jamming (This specification is CONFIDENTIAL)

PUBLICATIONS

Air Force-Navy Aeronautical Bulletin

No. 143	Specifications and Standards; Use Of

FSC5821

THE REPUBLICAN PRESS, Hamilton, Ohio
December 24, 1957 1500

(Copies of documents required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

3. REQUIREMENTS

3.1 Preproduction.- This specification makes provisions for preproduction testing.

3.2 Associated Equipments.- The equipment covered by this specification shall operate satisfactorily with the following associated equipment:

Control, Converter-Radio Receiver C-1672( )/ARR-39
Control, Receiver C-1276/ARR-39
Control, Receiver, Radio Set C-1057A/ARC-34
Intercommunication Set AN/AIC-10
Antenna AT-256/ARC, or equivalent
Converter, Signal Data CV-282/ARR-39, or equivalent
Mounting MT-1260A/ARR-39
Mounting MT-1743/ARR-39
Mounting MT-1500/ARR-39
Power Supply PP-1236A/ARR-39
Control, Receiver C-2368/ARR
Mounting MT-1965/ARR

3.2.1 For the AN/ARR-39A:

Control, Converter-Radio Receiver C-1672( )/ARR-39 (See NOTE)
Control, Receiver C-1267/ARR-39 (See NOTE)
Control, Receiver, Radio Set C-1057( )/ARC-34 (See NOTE)
Intercommunication Set AN/AIC-10
Antenna AT-256/ARC, or equivalent
Converter, Signal Data CV-282/ARR-39, or equivalent

NOTE: Control, Receiver, Radio Set C-1057A/ARC-34; Control, Receiver C-1276/ARR-39; Control, Converter-Radio Receiver-C-1672( )/ARR-39; and Control, Receiver C-2368/ARR-are interchangeable only when proper adaptor cords are used.

3.2.2 For the AN/ARR-44A

Intercommunication Set AN/AIC-10
Antenna AT-256/ARC, or equivalent
Converter, Signal Data CV-360/ARR-44
Control, Receiver C-2368/ARR

3.3 General Specification.- The requirements of MIL-E-5400 for class 1 equipment apply as requirements of this specification with the exceptions and additions called out herein. When the two specifications conflict, this specification shall govern.

3.3.1 Mounting of Fixed Capacitors.- The allowable lead length for capacitors weighing less than 1/2 ounce supported by their own leads shall be 1-1/2 inches instead of 1 inch.

3.3.2 Connectors For Voltmeter or Milliammeter Measurements.- The requirements of MIL-E-5400 shall not apply to the connectors used with the special test equipment, Test Set, Radio AN/URM-76 and Test Set, Data Link AN/PSM-10.

3.3.3 Connectors, Wired-In.- Exception shall be taken to that part which requires tubing long enough to cover at least 1/2 inch of the wire attached to the terminal. Instead, tubing shall be at least 1/4 inch long.

3.3.4 Mounting of Resistors.- The allowable lead length for resistors weighing less than 1/2 ounce supported by their own leads shall be 1-1/2 inches instead of 1/2 inch.

3.3.5 Welding.- Exception shall be taken to that portion which requires not less than 2 spot welds be made on each part. Where one weld gives sufficient strength, it will be adequate.

3.3.6 Wiring (Internal).- Exception shall be taken to that portion which requires that all holes through which wires pass shall be grommeted. This specification allows for the use of tubing over the wire instead of the grommeted hole.

3.3.7 Cooling.- The blower for cooling the radio receiver shall be mounted so that it can be easily removed from the case. The construction shall be such that the receiver will be operable when the blower motor is removed and cooling air supplied from an external air source, with or without the mounting of the receiver in place.

3.3.8 Interference

3.3.8.1 Transients.- The transient conditions of MIL-E-7894 shall be considered in the design of the equipment to the extent that the equipment shall not suffer permanent damage when the transients are present on the primary power lines.

3.3.8.2 Jamming.- The requirements of MIL-T-26242 and MIL-T-25016 apply.

3.3.9 Life.- The equipment shall be capable of 200 hours of operation without servicing and 2000 hours of operation with reasonable servicing. Replacement of vacuum tubes operated within their specific rating is not considered an equipment failure providing the failure is not a result of circuit design. The equipment shall furnish specified performance after the life test.

3.3.10 Maintenance Provisions.- Each maintenance adjustment shall be marked with a suitable symbol or descriptive abbreviation to permit its ready identification. Each maintenance adjustment shall be of the screwdriver adjustment type with a grounded metal shaft except for the trimmer capacitors on the crystal ovens which may be above ground. The equipment shall be designed so that no maintenance adjustments will be required under flight conditions.

3.3.11 Service Conditions (Environmental).- The maximum altitude shall be 60,000 feet instead of 50,000 feet.

3.4 Standard Model.- A standard model of Receiver, Radio R-574C/ARR-39 will be furnished to demonstrate the minimum acceptable standard of materials, design, workmanship, and performance not specified herein. It will also be used to determine compliance with the required functional and dimensional interchangeability. If it conflicts with this specification, this specification shall govern.

3.5 Selection of Specifications and Standards.- Specifications and standards for necessary commodities and services not specified herein shall be selected in accordance with ANA Bulletin 143.

3.6 Design and Construction

3.6.1 Piezo-Electric Crystal Units.- Piezo-electric crystal units shall be in accordance with the requirements of MIL-C-3098 except where crystals having higher or lower frequencies, or a higher degree of accuracy, or other characteristics not covered by that specification must be used.

3.6.2 Circuits.- All circuits shall be designed so that no damage will occur when the equipment is operated with associated equipment and the operating controls and service adjustments thereof are set to any possible combination of settings.

3.6.3 Separable Component Parts.- All separable component parts shall be designed so that they can be inserted in the equipment in but one position, that position being the one for optimum operation and performance.

3.6.4 Separable Subassemblies.- The design of the major subassemblies shall be such that they may be removed from the chassis proper, either singly or in combination, without unsoldering any connections. After being so physically removed from the chassis proper, it shall be possible to interconnect them with the chassis to form a complete working unit for test purposes.

3.6.5 Handles.- A handle or handles shall be provided on the front panel of the equipment to enable safe and easy removal of the mounting from the case.

3.6.6 Tube Heater and Filament Circuits.- These circuits shall be arranged so that the removal of any tube or group of tubes, not to exceed 50 percent of the total number in the equipment, or failure of the heaters or filaments thereof, shall not result in excessive voltages being placed on the heaters or filaments of the remaining tubes.

3.6.7 Front Panel Facilities.- The front panel of the receiver shall provide receiver gain control, receiver squelch control, headset test jack or a test receptacle suitable for monitoring audio output, and an antenna connector.

3.6.8 Service Bench Operation.- When the covers are removed from the case it shall be possible to place it on any side, except front and rear, on a smooth surface without causing damage to any component thereof. It shall be possible to operate it fully with the covers removed, but the detailed performance specified herein need not be provided while the covers are removed.

3.6.9 Electrical Connectors (External).- Electrical connectors for interconnection of the receiver with the power supply, control panel, and other equipments shall be the smallest and lightest that will perform the required function. The terminal numbers shall be legibly marked on at least one side of each plug or receptacle, but preferably on both sides. Connectors shall be in accordance with MIL-C-5015 or MIL-C-8384, whichever is applicable.

3.6.10 Size and Weight of Components.- The various components shall not exceed 40 pounds in weight.

3.6.11 Power Requirements.- The equipment shall operate from the power source described below. There shall be no provisions for primary power fuses in the equipment.

3.6.11.1 Power Source

a. 28 volt dc source

Operating voltage limits: 25 to 29 volts
Standby voltage limits: 14 to 29 volts
Maximum operating current: 10 amperes

b. 115 volt, ac source

Operating voltage limits: 108 to 121 volts
Standby voltage limits: 102 to 124 volts
Operating frequency limits: 330 to 1200 cps
Standby frequency limits: 300 to 1200 cps
Minimum operating factor: 80 percent
Maximum operating volt amperes: 300 volt amperes

3.7 Performance

3.7.1 General.- The purpose of the receiver is to receive amplitude modulated r-f signals and to deliver voice signals in the approximate range of 200 to 6000 cycles per second to a voice channel circuit, and data signals in the approximate range of 7500 to 20,000 cycles per second to a signal data converter circuit.

3.7.2 Range and Channel Spacing.- The receiver shall provide 1750 r-f channels starting with 225.0 mc and extending upward in frequency in 100 kc steps to and including 399.9 mc.

3.7.3 Sensitivity, Voice (Normal).- The sensitivity of the voice channel shall be such that with a 5-microvolt standard voice channel input signal, the signal-plus-noise to noise ratio shall be 10 db at the voice output circuit across the standard 150-ohm resistance load.

3.7.4 Sensitivity, Data (Normal).- The sensitivity of the data channel shall be consistent with the sensitivity requirements for the voice channel. When operating with Converter, Signal Data CV-553/ARR-39B, the receiver shall provide a signal so that the converter shall accept at least 90 percent of the messages sent when the antenna signal of 5 microvolts is modulated 15 percent by a single subcarrier.

3.7.5 Sensitivity, Voice (Service Conditions).- The input signal required to produce a 10 db signal-plus-noise to noise ratio shall not exceed 16 microvolts when the receiver is operating under any natural combination of extreme conditions of temperature, humidity, reduction of power source voltage to the lowest specified limit, and when vacuum tubes are selected at random. The input signal required when operating under any one of the above-mentioned service conditions shall not exceed 10 microvolts. (The modulation of the r-f input signal, and the load of the receiver shall be the same as for normal sensitivity.)

3.7.6 Sensitivity Data (Service Conditions).- The sensitivity of the data channel under service conditions shall be consistent with the sensitivity requirements for the voice channel.

3.7.7 Selectivity.- The response to signals differing from the center frequency shall be as follows:

Signals differing from center frequency by:	Response
40 kc and less	Not more than 6 db down from responses at center frequency and essentially flat-topped over the pass band
40 kc to 125 kc	Essentially linear with frequency
125 kc	Not less than 60 db down from response at center frequency
125 kc to 165 kc	Not greater than that represented by a straight line curve between the response points at 125 kc and 165 kc
165 kc	Not less than 70 db down from response at center frequency

3.7.7.1 Spurious Response.- Response at the i-f frequencies shall be at least 80 db below the response at the center frequency. Response to signals differing by more than 165 kc from the center frequency shall be at least 80 db below the response at the center frequency, with the following exceptions:

3.7.7.1.1 For Center Frequencies Between 225.0 mc and 390.0 mc.- Response to signals at the image frequency shall not be less than 60 db below the response to signals at the center frequency. Response to signals differing from the center frequency by 0.5 mc or less shall not be less than 60 db below the response to signals at the center frequency. In the range of 2.0 mc to 400.0 mc, excluding frequencies within 0.5 mc of the center frequency, no more than 3 responses, in addition to the image response, shall exist less than 80 db below the response at the center frequency.

3.7.7.1.2 For Center Frequencies Between 390.1 mc and 399.9 mc.- Response to signals at the image frequency shall not be less than 55 db below the response to signals at the center frequency. Response to signals differing from the center frequency by 0.5 mc or less shall be at least 40 db below the response to signals at the center frequency. In the range from 2.0 mc to 400.0 mc, excluding signals within 0.5 mc of the center frequency, no more than 3 responses, in addition to the image frequency, shall exist less than 80 db below the response at the center frequency. Such responses shall be at least 60 db below the response at the center frequency.

3.7.8 Frequency Accuracy.- The frequency accuracy under any natural combination of service conditions shall be such that the center frequency falls within plus or minus 10 kc of the nominal frequency. All factors affecting center frequency accuracy, such as injection frequency generating system, intermediate frequency adjustment errors, intermediate frequency stability and the like, shall be included in these limits.

3.7.9 Resettability.- The electrical and mechanical characteristics of the receiver shall be such that substantially the same power output is obtained each time any particular channel is selected. Any change or recycling shall not cause the power output from the receiver to deviate by more than 10 percent from that obtained originally.

3.7.10 Output Circuits.- The output signals shall be available on two separate circuits. The first, referred to as the voice circuit, shall provide a reproduction of the original voice signal modulation. The second, referred to as the data circuit, shall provide a reproduction of the original data signal modulation in a form suitable for feeding the input of an associated signal data converter. The signals to be fed to the converter shall be in the approximate range of 7.5 kc to 20 kc.

3.7.11 Power Output (Voice).- The power output capability at the voice output circuit shall not be less than 200 milliwatts (5.5 volts) into a 150-ohm resistive load with an r-f input signal of 1000 microvolts modulated 90 percent at 1000 cps. When the load is changed to 50 ohms resistive and other conditions remain unchanged, the voltage across the load shall not decrease by more than 55 percent from the value obtained across the 150-ohm load.

3.7.12 Power Output (Data).- The power output capability of the data output circuit shall not be less than 0.36 volts rms across the standard data channel load with an r-f input signal of 1000 microvolts rms modulated 15 percent at 10 kc. With the receiver gain set to produce 0.36 volts rms output at 15 percent modulation, the power output shall not be less than 2.16 volts rms plus or minus 1 db when the modulation is increased to 90 percent. These measurements may be corrected by the known accuracy of the measuring equipment used.

3.7.13 Audio Fidelity (Data).- The overall fidelity shall be such that the voltage across a 150-ohm resistive load will not vary from the reference level (voltage at 1000 cps) by more than plus 1 db or minus 3 db in the range of 300 to 4000 cps.

3.7.14 Audio Fidelity (Data).- The overall fidelity shall be such that the voltage across the standard data channel load shall not vary from the standard reference level by more than plus 1 db or minus 1 db in the range of 7500 cps to 20,000 cps.

3.7.15 Audio Distortion (Voice).- With a 1000-microvolt input signal modulated to a maximum of 90 percent at any frequency in the range of 300 to 5000 cps, and an output of 5.5 volts across the 150-ohm resistive load, the total distortion in the output voltage, with the noise limiter disabled, shall not exceed 20 percent.

3.7.16 Audio Distortion (Data).- With a 1000-microvolt input signal modulated to a maximum of 90 percent at any frequency in the range of 7500 to 20,000 cps and with an output of 2.16 volts rms, plus or minus 1 db, across the standard data channel load, the total harmonic distortion in the output voltage shall not exceed 1 percent.

3.7.17 Automatic Gain Control (Voice and Data).- When the input signal to either the voice or data channel changes from 1000 microvolts to 0.1 volt, the automatic gain control shall control the output within ±2 db. When the input signal is decreased from 1000 microvolts to 5 microvolts for the voice channel and from 1000 microvolts to 30 microvolts for the data channel, the output voltage from each channel shall not decrease by more than 3 db from the output voltage at 1000 microvolts input.

3.7.18 Squelch Control.- In the clockwise stop position of squelch control, squelch action shall be ineffective. In the counterclockwise stop position between 10 and 500 microvolt input shall open the circuit. Smooth and essentially linear relation shall be provided between the number of angular degrees of rotation of the squelch control and microvolts input necessary to operate the squelch. With the squelch control adjusted so that the receiver output is just quieted with no r-f input signal, the r-f input signal required to unsquelch the receiver output shall not exceed 5 microvolts. The receiver shall be considered unsquelched when the output voltage is within 2 db of the voltage obtained when the squelch control is rotated fully clockwise.

3.7.19 Low Frequency Stability.- There shall be no evidence or indication of flutter of low-frequency instability with unmodulated carrier input signals of 0.5 volt to 5 microvolts at or near resonance for any setting of the volume control.

3.7.20 Channel Changing Time.- The time required for selection of a given preset r-f carrier under standard test conditions, measured from the instant a given channel is selected to the instant that the given channel is in an operative condition, shall not exceed 6 seconds. The time elapsed for selection of a given channel, under extreme conditions as specified herein, measured from the instant the given channel is selected by the operator to the instant that the channel is in an operative condition for reception, shall not exceed 12 seconds, excepting that the channel changing time shall not exceed 16 seconds under conditions of high temperature (+71°C).

3.7.21 Warmup and Stabilization Time.- The time required for the receiver to become fully operative after the primary power is turned on shall not exceed 75 seconds. An additional 105 seconds shall be allowed for compliance with the stated frequency requirements.

3.7.22 Noise Level (Internal).- The noise output from the receiver with the specified phantom antenna connected, no signal input (squelch circuit inoperative and the receiver operating) shall not exceed 1.5 volts across 150 ohms at the voice output circuit. With the squelch circuit operative this voltage shall not exceed 0.15 volt. For each of the above conditions the internal audio gain control shall be set to obtain 200 milliwatts audio power output into a 150-ohm resistive load with an r-f input signal of 1000 microvolts, modulated 90 percent at 1000 cps.

3.7.23 Vibration Modulation.- All wiring, circuit elements, and other parts of the equipment shall be fabricated so that modulation due to vibration as specified herein shall not produce an output of more than 10 milliwatts above the output obtained when the equipment is not subjected to vibration.

3.8 R-F Input Impedance.- The receiver input circuits at the operating frequency shall not produce a voltage standing wave ratio greater than 3.5 to 1 on a 51.5-ohm transmission line.

3.9 Muting.- The voice audio output of the receiver shall be muted to the lowest practicable minimum during the automatic tuning process.

3.10 Power Supply PP-1236A/ARR-39.- A power supply, including the required filters, shall be packaged separately and shall meet the same general requirements as the components with which it is to be used. The power supply shall supply the high voltage required for operation of the receiver. The power supply shall obtain its primary power from a 115 volt ac source, described in 3.6.11.1.

3.11 Control.- The following controls shall operate the receiver by remote control:

a. Control, Converter-Radio Receiver, C-1672( )/ARR-39
b. Control, Receiver C-1276/ARR-39
c. Control, Receiver, Radio Ser C-1057A/ARC-34
d. Control, Receiver C-2368/ARR

4. QUALITY ASSURANCE PROVISIONS

4.1 Classification of Tests.- The inspection and testing of the radio receiver shall be as follows:

a. Preproduction tests . . . . See 4.2

b. Acceptance tests . . . . . See 4.4

4.2 Preproduction Testing

4.2.1 Preproduction Test Samples Tested by the Contractor.--The contractor shall subject three representative radio receivers to the tests specified in 4.5.

4.2.2 Preproduction Test Procedures.- Prior to any formal testing of the radio sets, the contractor shall submit three copies of his proposed test procedure, based on 4.5, to the procuring activity and shall receive approval therefor. The proposed test program shall include the following:

a. A complete set of test procedures, including block diagrams describing the test sequence, equipment adjustments, and data to be recorded.

b. A list of test equipment to be used, identified by manufacturer and type number.

4.2.3 Preproduction Test Report.- After the contractor completes the preproduction tests, he shall prepare a report in accordance with MIL-T-9107 and furnish three copies to the procuring activity. A list shall be included of all failures which occurred during the test, specifying the circuit reference symbol number, manufacturer's name, title of the test in which the failure was found, the degree to which the test limit was exceeded, how the failure was corrected, and what steps were taken to see that failure did not happen again.

4.2.4 Preproduction Test Sample For the Procuring Activity.- Along with the test report the contractor shall submit the samples to the procuring activity who will use them

a. For a review of the mechanical construction of the product.

b. To perform any tests, included in the specification, after reviewing the contractor's test report.

4.3 Test Conditions

4.3.1 Standard Test Conditions

a. Temperature: 15°C to 35°C

b. Humidity (Relative): Between 10 and 95 percent

c. Atmospheric: Room ambient

d. Vibration: None

e. Primary power: 27.5 ± 2 volts dc
115 ± 2 volts 400 cps ± 10 percent

f. Warmup period: 15 minutes

g. Input signal (voice): The standard input signal shall be modulated 30 percent at 1000 cps for sensitivity and automatic gain control measurements.

h. Input signal (data): The standard input signal for sensitivity and automatic gain control measurements shall be modulated 15 percent at 10 kc.

i. Audio load: The audio load for the voice channel shall be a 150-ohm resistive load.

j. Data load: The load for the data channel shall be a resistive load of 1300 ohms plus or minus 15 percent.

k. Receiver audio reference level: The voice channel reference level shall be an output of 5.5 volts across the standard load with the r-f input modulated 90 percent at 1000 cps.

l. Data reference level: The data channel reference level shall be an output of 0.36 volts rms with the standard data channel input signal and load.

m. Input signal: The voice data input signal is defined as the open circuit rms voltage of a signal generator having a 51.5 ohm nonreactive resistance.

4.4 Acceptance Tests.- Acceptance tests shall consist of:

a. Individual tests.

b. Sampling plan and tests.

4.4.1 Individual Tests.- Each radio receiver shall be subjected to at least the tests specified in 4.5.1, 4.5.2, and 4.5.19.

4.4.1.1 Individual Test Procedures.- Prior to any formal testing of the radio sets the contractor shall submit three copies of his proposed test procedures, based on 4.5.1 and 4.5.2 to the procuring activity and receive approval therefor. The proposed test program shall consist of a complete set of test procedures including block diagrams describing the testing sequence, radio set adjustments, and the data to be recorded.

4.4.2 Sampling Plans And Test

4.4.2.1 Sampling Plan.- One percent of all radio sets produced on the contract shall be subjected to the tests specified in 4.4.2.

4.4.2.2 Sampling Tests.- Sampling tests shall consist of those described in 4.5.1, 4.5.2, 4.5.3, 4.5.9, 4.5.10, 4.5.11, 4.5.12, 4.5.13, 4.5.14, and 4.5.19.

4.4.2.3 Life Testing On A Sample Basis.- In addition to the minimum testing to be performed on a one percent sample, a 2000-hour life test shall be performed on the first set on contract. If the test is completed before completion of the contract, a second set shall be placed on life test, etc, until completion of the contract.

4.4.3 Sample Test Procedures.- Prior to any formal testing of the radio sets, the contractor shall submit three copies of his proposed procedures based on 4.4.2 to the procuring activity for approval. The proposed test program shall include the following:

a. A complete set of test procedures including block diagrams describing the testing sequence, equipment adjustments, and data to be recorded.

b. A list of test equipment to be used identified by manufacturer and type number.

4.4.4 Acceptance Criteria.- When one or more items fail to meet the specification, acceptance of all items will be withheld until the extent and cause of failure are determined. After corrections have been made, all necessary tests shall be repeated.

4.4.4.1 Retest.- The contractor shall correct the defect in each radio set that fails and retest the radio set for the requirement that the radio set failed to meet. He shall perform any additional tests which the procuring activity deems necessary to be sure that the radio set was not damaged or misaligned during rework.

4.5 Test Methods.- The methods of conducting the preproduction and acceptance tests are described in the following subparagraphs.

4.5.1 Bench Tests.- All bench tests, special bench tests and tube replaceability tests shall be conducted under standard conditions as specified in 4.3.1. The following subparagraphs describe the minimum testing to be performed during any bench test either for acceptance of the receiver or to otherwise prove satisfactory operation. This is also the minimum testing to be performed by the contractor before and after all the environmental tests to prove that the receiver meets the requirements of section 3.

4.5.1.1 Preliminary Check.- The receiver shall be checked to assure that all power relays, time delay relays, control voltages, and blower motors are operating properly.

4.5.1.2 Sensitivity.- The receiver shall be checked to assure that the sensitivity requirements of 3.7.3 and 3.7.4 are met. At least 20 random r-f channels shall be included in the test.

4.5.1.2.1 Measurement of Sensitivity.- A Hewlett-Packard Model 608B signal generator or equivalent which has a nominal 50-ohm constant source impedance, shall be used as a signal source. The signal generator shall be connected to the radio receiver antenna connector through a 5-foot length of RG-8/U cable. An approved audio output meter shall be connected to the output of the radio receiver. The impedance of the output meter shall be set to the specified load resistance. The signal generator attenuator shall be set to approximately 3 microvolts; be sure the signal is modulated the specified percent at the specified frequency. The signal generator frequency shall be adjusted to the frequency of the receiver by adjusting the frequency dial of the signal generator until maximum receiver audio is obtained. The signal generator attenuator, with the modulation alternately on and off, shall be adjusted so as to obtain a receiver output value with modulation off, which is one-tenth the value with modulation on. The figure on the attenuator multiplied by two is the sensitivity of the receiver in microvolts at a signal-plus-noise to noise ratio of 10 decibels.

4.5.1.3 Resettability.- Each receiver shall be tested to assure that it turns to the frequency indicated on the control box at all times.

4.5.1.4 Selectivity.- Each radio receiver shall be tested for compliance with 3.7.7.

4.5.1.4.1 IF Selectivity.- The center frequency shall be within 1 kc of 15.825 mc. All measurements shall be made with a frequency counter to an accuracy of ±0.002 percent. To perform this test, the signal generator shall be connected directly to the i-f and audio chassis.

4.5.1.4.2 Image Rejection.- The r-f input at the input to the receiver to give -1.0 volt alternating gain control shall be at least 55 db down at the image frequencies (± 31.65 mc) from that at the frequency to which the receiver is tuned. At least six r-f channels shall be checked on each receiver.

4.5.1.4.3 IF Response.- Response to the i-f frequencies shall be checked to assure that the requirements of section 3 are met.

4.5.1.4.4 Spurious Response.- At least six r-f channels shall be checked to assure compliance with 3.7.7.1.

4.5.1.5 Power Output.- Each receiver shall be tested with standard inputs on both the voice and data channel and the output voltages shall be as specified under 4.3.1(1).

4.5.1.6 Fidelity.- The fidelity of the receiver shall be checked under standard input voltages, output load conditions. The limits in the following table apply:

Frequency	Limits
300 - 1000	+1 -3 db
1000	0 db (audio reference)
1000 - 4000	+1 -3 db
10 kc	0 db (data reference)
7500 - 20 kc	± 1 db

4.5.1.7 Distortion.- Each set shall be tested for compliance with the requirements of 3.7.15 and 3.7.16. At least three frequencies in both the voice and data range of frequencies shall be checked.

4.5.1.8 Automatic Gain Control.- Each radio set shall be tested to assure that the requirements of 3.7.17 are met. A frequency of 399.9 mc shall be used.

4.5.1.9 Squelch.- Each receiver shall be tested so that with standard output conditions:

a. The voice output shall decrease to 0.15 volts or less in the fully squelched condition.

b. The r-f input signal to open the squelch shall be between 100-5000 microwatts with the set fully squelched.

c. The voice output shall be 1.5 volts across a standard load for the same input as in b, but with the receiver unsquelched.

d. The value of r-f input necessary to unsqualch the receiver when it is just quieted shall be 5 microvolts or less.

4.5.1.10 Low Frequency Stability.- Each receiver shall be tested to assure compliance with 3.7.19.

4.5.1.11 Reactance Tube Voltage.- With the r-f input set at 225.0 mc and a voltmeter on the grid of the reactance tube, the tuning control shall be recycled. The voltage shall be 5.0 ± .2 volt.

4.5.1.12 Channel Changing Time.- Each set shall be tested under standard conditions and the r-f channel changed from 399.8 to 399.9 mc. This time shall not exceed 6 seconds.

4.5.1.13 Muting.- Each radio set shall have its audio connected to a headset to determine if excessive noise is present.

4.5.1.14 R-F Input Impedance.- At least seven frequencies shall be checked to assure compliance with 3.8.

4.5.2 Burn-In And Shakedown Procedure.- The burn-in and shakedown procedure consists of vibrating and operating the equipment in 1-hour cycles for a period of 24 hours. The 1-hour cycles shall consist of having the power on for a period of 50 minutes and the power off for a period of 10 minutes. Also, sometime during the power-on period the equipment shall be vibrated parallel to its front panels in the horizontal plane with the frequency cycling between 10 and 500 cps in 2-minute cycles at an applied double amplitude of 0.005 inch or an applied acceleration of ± 1g, whichever is the limiting value. The equipment shall be monitored every third hour during the on period to determine satisfactory operation when operating as a part of a complete data link system. The bench test of 4.5.1 shall be performed before and after the burn-in and shakedown test.

4.5.3 Line Voltage Variation.- Data shall be taken for each of the power input voltages indicated below:

a. Nominal voltage: 27.5V dc; 115V ac, 400 cps ± 5 percent

b. Low limit: 25.0V dc; 108V ac, 400 cps ± 5 percent

c. High limit: 29.0V dc; 121V ac, 400 cps ± 5 percent

4.5.4 High And Low Frequency Limit.- Data shall be taken with the equipment operating under standard test conditions except that the a-c power input shall be 108 volts ac, 330 cps and 121 volts ac, 1200 cps.

4.5.5 Explosion Proofing.- The explosion proof test shall be performed in accordance with MIL-E-5272, procedure I. Upon request, this test will be performed by the procuring activity and witnessed by the contractor.

4.5.6 Life.- The equipment shall be subjected to a 2000-hour life test under standard test conditions. The equipment shall be operated intermittently with the equipment turned on for approximately 3 hours and off for approximately 1 hour. During the time that the equipment is in operation a 500-microvolt signal modulated 20 percent at 1 kc shall be applied to the input terminals. The voice channel output should be 5.5 volts rms plus or minus 0.55 volts rms for any r-f frequency. The electrical performance shall be observed periodically to determine when failures occur. In the event of failure during this test, repair shall be made and operation resumed for the balance of the test period. A record shall be kept of all such failures throughout the test indicating: a. The name of the manufacturer. b. The part function. c. The circuit reference symbol number. d. The nature of the failure, and the nature of the repair. A report of all failures during the first 200 hours of the test shall be submitted to the procuring activity immediately upon completion of 200 hours of operation. In this report the contractor shall propose a program which shall evolve a suitable and adequate design or material corrections for all failures which occurred. The procuring activity will review such proposals and determine whether they are acceptable.

In addition, at the completion of the test, the contractor shall submit to the procuring activity a similar report of all failures during the entire test.

4.5.7 Interference

4.5.7.1 Transients.- The equipment shall be subjected to transient voltage of a magnitude and duration as specified in MIL-E-7894, or to transient voltages which approximate those specified in MIL-E-7894.

4.5.7.2 R-F Interference.- R-f interference measurements shall be conducted in accordance with MIL-I-6181.

4.5.7.3 Interference Tests.- The equipment shall be completely operated in every way normal for its operation standby, cycling to a different frequency or channel, blowers operating, fans running, heating elements operating, and the like. Arrangement of the various components making up the complete equipment shall be such that it simulates a typical installation but may be such that it permits measurement of interference from each component separately to localize the source of the interfering signal. The frequency ranges specified in MIL-I-6181 shall be scanned continuously with the applicable test instruments to determine specific frequencies of interference.

4.5.7.4 Scanning.- During scanning, the sensitivity of the test equipment shall be maintained sufficiently high so that the background noise level, as indicated both aurally and by the applicable meter, is unmistakably recognizable. Scanning shall be done under the following conditions:

a. With the test equipment properly oriented for pickup of radiated interference.

b. With the applicable test equipment arranged for pickup of conducted interference and connected to a particular lead of the equipment under test found by experience to be likely to conduct interference.

Any specific frequency thus determined or any broad-band interference shall be measured. Conducted interference shall be measured on each external conductor of the equipment under test. In general, pickup devices used in detecting and measuring radiated interference shall be oriented for maximum pickup at a distance of 1 foot from the equipment under test. However, the orientation need not be other than vertical for rod antenna pickups or other than horizontal for dipole antenna pickups. In no case need the pickup devices be held above the equipment under test.

4.5.7.5 Jamming Interference.- Jamming interference measurements shall be conducted in accordance with MIL-T-26242 for the data portion of the frequency spectrum and in accordance with MIL-T-25016 for the voice portion of the frequency spectrum.

4.5.8 High Temperature Tests.- The high temperature tests shall be conducted in accordance with MIL-E-5272, procedure I, except as changed by the following:

4.5.8.1 High Temperature Test (Plus 55°C)

a. With the equipment inoperative, the ambient temperature shall be raised to plus 55°C.

b. The equipment shall be maintained inoperative at plus 55°C for at least 2 hours.

c. The equipment shall then be operated at plus 55°C for a period of 4 hours.

d. With the ambient temperature maintained at plus 55°C, the equipment shall be checked to determine that its performance is in accordance with that required in section 3.

4.5.8.2 High Temperature Test (Plus 71°C)

a. With the equipment inoperative, the ambient temperature shall be raised to plus 71°C.

b. The equipment shall be maintained inoperative at plus 71°C for at least 24 hours. While at this temperature, the equipment shall be operated for at least 1/2 hour to determine that its performance is in accordance with that required in section 3. Subject to approval of the procuring activity, limited degradation of performance shall be allowed.

c. The equipment shall then be allowed to cool to room temperature and shall be checked to determine that its performance is in accordance with that required in section 3.

4.5.9 Low Temperature Test.- The low temperature test shall be conducted in accordance with MIL-E-5272, procedure II.

4.5.10 Altitude.- The altitude test shall be conducted in accordance with MIL-E-5272, procedure II, except as changed by the following:

a. The internal pressure of the altitude chamber shall be maintained at 2.13 (60,000 feet) inches of mercury instead of 3.44 inches of mercury.

b. The equipment shall be maintained at minus 54°C and 2.13 inches of mercury for approximately 1 hour nonoperating.

c. After a 15-minute warmup period and while the equipment is maintained at the conditions specified in b. above, the equipment shall be checked to determine that its performance is in accordance with that required in section 3.

4.5.11 Temperature-Altitude Test.- The equipment shall be subjected to the temperature-altitude test specified in MIL-E-5272 for equipments designed for continuous operation at +55°C. Step 3 shall be performed. The temperature in step 5 shall be +71°C.

4.5.12 Humidity.- The humidity test shall be conducted in accordance with MIL-E-5272, procedure I. Immediately upon completion of the test, the equipment shall provide the performance specified in section 3.

4.5.13 Vibration.- The equipment shall be subjected to the vibration specified in MIL-E-5272, procedure XI. While undergoing the vibration test, the equipment shall provide the performance requirements of section 3.

4.5.14 Shock (Service).- Each component shall be subjected to a 15g shock test in accordance with MIL-E-5272, procedure II. After completion of this test, the equipment shall be checked to determine that its performance is in accordance with section 3.

4.5.15 Shock (Crash).- The equipment shall be subjected to a 30g shock test in accordance with MIL-E-5272, procedure II, and shall meet the requirements as stated therein after completion of the test.

4.5.16 Fungi.- The contractor shall supply the procuring activity with certification that fungus-inert materials were used in accordance with MIL-E-5400. The fungus test specified in MIL-E-5272, procedure I, shall be performed by the procuring activity if it is deemed necessary.

4.5.17 Salt-Sea Atmosphere.- Individual black boxes of the equipment or subassemblies thereof shall be subjected to the salt spray test specified in MIL-E-5272. This requirement will be considered to have been met when the finishes on the various component parts of the equipment, in combination, meet the salt spray requirement.

4.5.18 Mechanical Inspection.- The equipment shall be examined to determine compliance of the equipment with the requirements for materials, workmanship, dimensions and markings, using whatever tools, gauges, scales, or other facilities that are necessary.

5. PREPARATION FOR DELIVERY

5.1 General.- The equipment shall be prepared for delivery in accordance with MIL-P-17555.

6. NOTES

6.1 Intended Use.- The equipment covered by this specification is intended for use in all weather, high performance, interceptor type aircraft for the reception of amplitude modulated r-f signals. It is intended for use with the command and control data link system.

6.2 Definitions

6.2.1 Jamming Interference.- Jamming interference is an intentional disturbance to radio reception and may be considered as the interfering electromagnetic wave in space, the interfering current in, or the interfering voltage impressed upon a circuit element.

6.2.2 Data Signal.- Data signals are those signals which carry the necessary information in code form to control an aircraft or missile.

6.2.3 Resonant Frequency.- Resonant frequency is that frequency within an r-f channel at which the receiver has the greatest sensitivity.

6.2.4 Nominal Frequency.- Nominal frequency is the assigned channel frequency.

6.2.5 Center Frequency.- Center frequency is that frequency midway between the frequencies at which the receiver sensitivity is 6 db below the sensitivity at resonant frequency.

6.2.6 Sensitivity.- Sensitivity is that voltage of a specified r-f signal in series with a specified phantom antenna and the input terminal of the r-f receiver required to produce a specified signal-plus-noise to noise ratio in the output signal of the r-f receiver measured across a specified load.

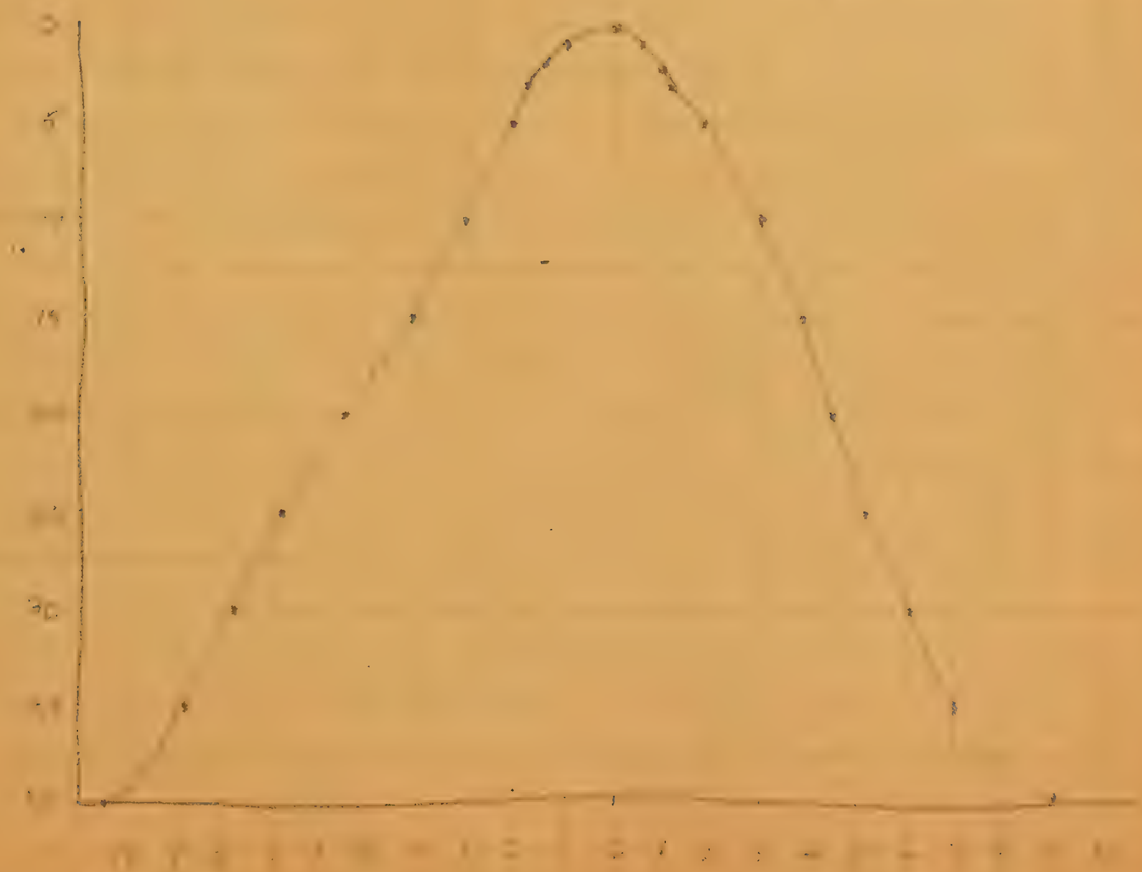
6.2.7 Desensitization.- Desensitization is the ratio of the sensitivity with a specified undesired noise to the sensitivity without the undesired noise.

6.3 Ordering Data.- Invitation for bids, contracts and purchase orders should state the conditions for the following:

6.3.1 Preproduction Samples.- It is expected that the contract or purchase order will specify that three equipments will be required as preproduction samples and that these preproduction samples will be subjected to the preproduction tests to determine compliance with the requirements of this specification. The invitation for bids and the contract should specify the point of inspection for these tests.

NOTICE: When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

[illegible]	[illegible]		[illegible]	[illegible]		
-3	-1.12	1.5	-1.1	-1.1	15	1.1
-5	-2.5	2.2	[illegible]	[illegible]	[illegible]	[illegible]
-10	-4	4.0	[illegible]	[illegible]	4	3.8
-15	-6	5.2	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	-6.8	6.2	[illegible]	-4.5	[illegible]	4.4
-25	[illegible]	7.2	-6.5	[illegible]	[illegible]	5.2
[illegible]	[illegible]	[illegible]	-7.5	[illegible]	-14	5.8
~~-35~~	-9.1	[illegible]	-8.5	[illegible]	[illegible]	7.0
-37	[illegible]	[illegible]	-34 -10	[illegible]	[illegible]	8.1
[illegible]		[illegible]		[illegible]	[illegible]	[illegible]



14
7.1
3.55

300 - 12
300 - 1000 - 13
300

MODIFICATION OF ARR-15

—[illegible]—

1. Product Detector (on [illegible])
2. [illegible] Multiplier [illegible] IF Strip [illegible] from [illegible]
   [illegible]
3. [illegible] and pick up – Check [illegible]
4. Repaint Labels of Front Panel [illegible]
5. Speaker & [illegible] to V.C. [illegible]
6. Check AVC
7. Move audio gain via cathode bypass capacitors

✓ 1. <u>Audio Filter Sw.</u> → Remove GND, Connect #4 Common Wire of S102 D06A06 and to wire pin 4,1 33A01 of S102

✓ 2. Connect common wire #2 & 3 of S102 (031A01 and 002A01) together and extend to hot lead of <u>J111 (Headphones)</u>

✓ 3. Connect <u>On/off Sw.</u> to pin 16/2 of P103 via wire pin 1,1 27A01 of S102 and other side to Pin 1 of P103 via wire pin 2,2 65A02 of S102

✓ 4. Pick up AGC on/off control via wire to pin 1 of E101, put other side of Sw. to gnd

✓ 5. Leave common wire #1 (035A02) of S102 hang.

✓ 6. Connect wire 026A01 (pin 1,2) of S102 to <u>Calibrate</u> Switch

✓ 7. Connect wire 08A02 (pin 2,1) of S102 to <u>BFO</u> Switch

✓ 8. Leave wire 48 A01 (pin 3,1) and wire 49 A01 (pin 3,2) of S102 hang.

✓ 9. Note lazy relays for Calib & CW